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MEDICINE IN THE UNION OF SOVIET SOCIALIST REPUBLICS.¹

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In these days when national insurance and other experiments are in the air, we as a profession must realize that it is our clear duty to lead in such matters, not permitting ourselves to be dragged behind some scheme formulated by politicians or civil servants. Towards this end it is necessary that we should have adequate knowledge of medicine in other lands, and more particularly of its social aspect. In this respect there is today no country in the world more interesting than Soviet Russia; so, since to the best of my knowledge no member of this Branch has as yet visited Russia, I have

set myself the task of studying Soviet medicine from the literature available.

It is necessary for any student of Russian affairs first of all to acquire some knowledge of the underlying meaning of the vast experiment in social reform and in the building of a new kind of civilization which began with the revolution of 1917. After the abdication of the Tsar there followed, as you will remember, several short-lived republican governments. Coexistent with these were the people's councils or soviets, which had for years been functioning openly in the country, surreptitiously in the cities. In the latter half of 1917, in response to a widespread public demand for "Peace, bread and land", the soviets almost bloodlessly seized power, and an all-Russian congress of soviets was summoned. The German terms were accepted and peace was declared. From then on there were for years aligned against the new Soviet Socialist Republic the armed forces of at least ten nations—nations which had fought on both sides during the

¹ Read at a meeting of the Western Australian Branch of the British Medical Association on June 16, 1937.

Great War. Hope of upsetting the new *régime* was thus stimulated, and erstwhile employers within Russia stirred up civil war, their troops (the "Whites") allying themselves with Russia's external enemies. Blood now flowed freely, and it was not until well on into the 'twenties that the soviet form of government was firmly established.

Despite this fact, we find from 1917 onwards the Soviet Government laying the foundations of a health service, which now after two decades is one worthy of emulation in many points. Writer after writer emphasizes the fact that with the coming of the new *régime* stress was no longer laid on the healing of disease, but on its prevention, and on the maintenance and betterment of the health of the community. The immensity of the task is not easy to realize: the territories of the U.S.S.R. constitute one-third of Europe, half of Asia, and one-sixth of the total land surface of the world; they connect Poland and Japan, the Arctic and Afghanistan; their area is over 8,000,000 square miles, and their population is 180,000,000, made up of no less than 175 distinct peoples speaking more than 120 languages. The Union is one of eleven socialist republics, all equal in status and all having the right freely to secede.

In Tsarist Russia there were roughly 13,000 medical practitioners, some few of them men of high professional standing. Medical services in the country were woefully inadequate, and even in the cities the medical men restricted their services for the most part to the wealthy. The poor, who constituted the vast majority of the population, were left largely to the mercy of partly trained medical orderlies known as *feldschers*—a system which, I am told, has a parallel in India today. Hospitals were few, and for the most part ill-equipped. Of the adequacy or otherwise of the supply of drugs in Tsarist days I have been able to find no particulars.

I propose to consider the problems confronting the newly constituted health services under the following sections: (i) Hygiene and the treatment (and, when possible, the elimination) of disease. (ii) School medical services. (iii) The provision of a sufficient and adequately trained medical personnel. (iv) Hospital services and the provision of a sufficient and adequately trained nursing personnel. (v) The supply of drugs, instruments *et cetera*. (vi) The supervision of food and housing, and of living and working conditions. (vii) Research.

Hygiene and the Treatment of Disease.

From the hygienic standpoint, there could be conceived no more "impossible person" than the moujik or peasant of Tsarist times. During the long, cold winters, he and his family and many of his animals lived huddled together in a cottage, often of only one room. Clothes were changed only when the seasons compelled it. In the cities the workers were often housed in barracks attached to the factories. Lice swarmed, and as vectors of typhus they were a very real menace. Today we

find that the incidence of typhus is only two cases for every 100,000 of population per month.

In the Azov-Black Sea region 50% to 60% of farm workers used to be affected by malaria. In 1932 this number had been reduced to 1,463 per 10,000 of population; in 1935, thanks largely to the spraying of swampy areas by aeroplane, the incidence had dropped further to 211 per 10,000. For comparison, it is interesting that in India during 1933 the cases of malaria per 10,000 of population numbered 2,500 in the North-west Frontier Province, 1,200 in the Punjab, 630 in Bengal, and 220 in Madras.

Tuberculosis, one of the greatest scourges in the old days, has dropped to 45% of its 1914 figure. Dispensaries, sun-bathing establishments, open-air schools, sanatoria, and (more than all else) suitable jobs, have all helped towards this desirable end. One interesting innovation is the night sanatorium, where early sufferers from the disease, and also children with "weak chests" or those coming from tuberculous households, can spend twelve hours out of the twenty-four amidst the best of hygienic surroundings, whilst in the other twelve continuing to attend school or to earn full wages. Oral inoculation with Calmette vaccine has given promising results in infants, the mortality having been reduced 80%.

Inoculation has been even more successful in diphtheria. Up to 1935, 80,000 children had been immunized, the incidence having been reduced to 1:44 of its previous figure amongst this group. In all, one in one thousand of the inoculated children contracted diphtheria, and there were no deaths.

Inoculation against measles was commenced in Moscow in 1934. As a result, the death rate of measles patients under one year of age dropped from 39.0% to 4.6%. The scarlet fever figures for 1913 were 33 cases per 10,000 of population, and for 1933, five cases per 10,000 of population. The venereal disease figures for 1926 were 168 cases per 10,000 of population; by 1932 they had dropped to 63 cases per 10,000. Treatment by unqualified practitioners does not seem ever to occur. There is little professional secrecy; should a patient persist in failing to attend for treatment, his name is published openly on the factory "wall newspaper". No feeling of shame is evident unless the patient is proved to be a menace to others; in other words, the spirochæte and the gonococcus are recognized as pathogens and as pathogens solely.

That the Soviet health authorities have complete faith that they will be victorious in their fight against the infectious diseases is well shown in a recent edict; this states that in future all infectious diseases hospitals are to be built of wood, which will, it is confidently expected, suffice for the decade or two before infectious diseases are completely wiped out.

School Medical Services.

Since Russian youngsters spend a great deal of their time in the public crèches, which are a feature of every village and factory, it is an easy matter to supervise their health even in pre-school years.

Each large factory has its own medical officer or officers, who take a personal interest in their people. Later, when the youngster goes to school, he may obtain free all the milk he needs, and he is given at school a substantial meal each day. I was unable to find any detail about the school medical services, but one English dentist makes the comment that the Russian dentist is very expert in dealing with children. All observers agree that the standard of health amongst Russian children is obviously very high; one, however, remarks that in children up to three years of age there appears to be some degree of anaemia, owing possibly to the small part until recently played by meat in the diet of the Russian population.

Medical Personnel.

In pre-war Russia, in 1913, the doctors in towns numbered one for every 1,617 of the population; in the country areas they numbered one for every 25,000. For comparison it may be noted that England in 1911 had one for every 1,416. By 1933 the Russian figures had improved to one for every 750 in the towns, and one for every 14,200 in the country, and it is pointed out that the rational organizing of medicine during that period had made each doctor much more valuable to the community. Medical training at present consists of a five-year course, and refresher courses are taken after each three years. There are special centres for training specialists in maternal and child welfare, and also in sanitation and hygiene.

The general impression among observers has been that the standard of medical education has not been in the past as high as that obtaining in England, but that it is rapidly rising. It is interesting to note that this year, for the first time, knowledge of one foreign language was made compulsory for matriculation to a university.

Of the medical men carried over from the old *régime*, some were hostile to the Soviet form of government, others loyal to it. Pavlov, by the brilliance of his research work, became a national hero and was aided in every possible way by the Soviet Government. For some years the status of "worker" was but grudgingly accorded to the medical man. Nowadays he is respected, as having a useful part to play in the community. Roughly two-thirds of medical practitioners are women. As against the pre-revolutionary figure of 13,000 there are now in the Union of Soviet Socialist Republics 90,000 qualified medical practitioners, and a further 60,000 students are in training.

A feature of the country medical services are the "flying squads", which are promptly available to help the resident practitioners in districts where, for instance, local resources are strained by an epidemic.

Aeroplanes are largely used for this service, and also for ambulance work.

Hospital and Nursing Services.

The standard in the nursing profession was at first low. In 1922 any woman who could read and write could take a two-year course, then qualify.

By 1926 the standard had been considerably raised, a prerequisite being seven years' schooling; the course is now one of three years, including such general subjects as natural science and biology as well as strictly medical matters. Since 1933 the midwifery course has been three years. Short courses are also available in both general nursing and midwifery, but students from these do not rank as fully qualified nurses.

The country hospital services are admitted still to be inadequate, but they are rapidly being improved by such means as the provision at the larger communal farms of excellent though small midwifery hospitals. As I have said, aeroplanes play a large part in solving the problem of distance.

In the cities the population is grouped into lots of 40,000 to 100,000 persons, each centred round a poly-clinic. The clinic is responsible for all matters concerning health and disease in its district; these include maternal and child welfare, health visiting, public health services, sanitary inspection of houses, shops, and public baths, and the care of the sick, who are treated either in the clinic as out-patients, in their homes (nurses and extra bedding being supplied if necessary), or by being transferred to hospital. In Moscow a splendid ambulance service is available day and night, as promptly as the fire brigade service is in this country. Each ambulance van carries, in addition to the driver, a qualified medical man and an orderly or nurse; when the type of case appears to call for it, a psychiatrist replaces the general medical practitioner.

The district of the poly-clinic is divided into sub-districts of approximately 2,000 persons, each under a medical man, who in the morning takes an out-patient clinic and in the afternoon visits those sick in bed at home. Another medical man is available for night visiting. The clinic has its own pathology department, and a service of consultants is available as required, either at the clinic or at the patients' homes. The standard of work in these poly-clinics is high. One feature noted by several observers is that there is little delay, matters being so arranged that each patient arrives only a few minutes before he is due to be seen by his medical attendant.

The maternity hospitals are on the whole well equipped and efficiently staffed. The foremost is the Clara Zetkin Maternity Hospital in Moscow, where the morbidity figure is 15 per 1,000 and the mortality figure one per 1,000. It is interesting to compare the figure for all Moscow, 2.1 per thousand, with that of all England, 3.94 per thousand. In the cities scarcely any births now occur outside hospital, and there is no organization for births in the home. Pregnancy is neither a social nor a financial handicap. In Moscow about 70% of the adult females earn their own livings; when they become pregnant and report the fact at a clinic, they are given passes securing for them the right to the best seats in trams and in the underground railway, also the right to the first place in queues. Before and after delivery they are allowed from eight to twelve weeks' rest on full pay. On their return to work they are allowed time off to breast-

feed their infants at regular intervals without loss of pay. During babyhood and early childhood the children's daytime hours are usually spent in the factory crèches, and the night time is spent at home.

Breast-feeding is almost universal, though supplementing with human milk from another mother is used in some 5% to 10% of cases. In the larger centres there are "milk kitchens", where foods for weaning are made up to prescription and are issued free; at these depôts human milk is collected from mothers who have it to spare, and it is stored and issued as required for the use of infants whose mothers are less capable of lactation. One observer estimated that 80% of babies are still breast-fed at the age of six months. Russell's figures, obtained in North London welfare clinics, indicate that of 980 babies only 41% were entirely breast-fed at the age of four months.

Dentistry is regarded as part of medicine and surgery. As early as 1917 (the year of the revolution), steps were taken towards the formation of a national dental service, and by 1921 (before the end of the civil war) there were, in the Russian Republic alone, 1,881 public dental clinics in which 2,034 dentists were employed. One observer makes the comment that most Russian dentists are skilful orthodontists but indifferent makers of artificial dentures. There appears to be much less dental disease in Russia than in England, and one dentist to 12,000 of population is considered sufficient.

Supply of Drugs, Instruments et cetera.

During the twenties medical supplies constituted a very great problem, but since the first five-year plan, which very greatly increased the country's productive equipment, there has been little difficulty in obtaining supplies. The Soviet chemists have elaborated successfully a number of useful substitutes for drugs which cannot be produced locally, for example, quinine.

Considerable use is made of physical therapy, all equipment now being locally produced. An English dentist has made the following comments on the equipment of the dental clinics. It is nearly all of stainless steel; the dental rubbers are on the whole poor in quality; teeth are good and of varied form, but lack subtlety of shade and range of colour; cements are pure and cheap, and the dental chairs have pneumatic seats and back-rests, the arms and foot-rests being of stainless steel and very clean. He remarks that the equipment of the dental clinics generally is better than that of the best public clinics in England; also, that the travelling clinic he inspected was obviously designed by a dentist, and was infinitely better than one in England with which he was familiar. The equipment of a private practitioner was adequate without being lavish. (The term "private practitioner" is here correctly used, as in some instances private practice is permitted to both medical and dental practitioners; their accounts, however, are examined by the State and their fees are regulated. Neither partnership nor professional assistance is permitted to private practitioners.) An interesting comment is that the

standard of living of the average Russian dentist is approximately equal to that of an elementary school-teacher in England.

Supervision of Food, Housing, and Living and Working Conditions.

Food.—The task of supervising the food of the nation is rendered much simpler by the vast amount of communal eating. This habit appears to have come to stay, as is evidenced by the fact that even in the recently built flats and houses, which have adequate equipment for home cooking, little of it is done. Since 1927 most of the food of the larger cities goes through central depôts, where regular and careful bacteriological and chemical checks are made. Special care is taken with milk; the herds are tuberculin tested, and all uncertified milk is sterilized before use, but in no circumstances may it be supplied to children's institutions. Ice cream is made from real cream, and another great favourite with Russian youngsters is a paste of butter, eggs and soft cheese, chocolate flavoured. Most of the bread is now mechanically baked, and it is subject to careful and frequent analysis. The supply of meat, until recently, was quite inadequate, and it is still much below our standard in quantity. Considerable attention is paid to hygiene at food depôts; employees must submit to medical examination before and during employment therein; in milk depôts a daily shower bath and a complete change of clothing are obligatory; whilst in bakeries, shower baths, overalls, caps and manicures are the order of the day. The food laboratories, both chemical and bacteriological, are well equipped.

Country food supplies are for the most part unorganized, but it should be pointed out that, apart from the immensity of the task in the country, supervision becomes less necessary the nearer to its source the food is consumed.

Housing.—It is the duty of the management of each factory to see that employees are adequately housed, and the trade unions watch very carefully this right of their members. Owing to the immense influx of workers into Moscow for the new factories, it was only recently that any real success was met with in dealing with overcrowding. In the cities flats are very largely used, and the accommodation that is available is still poor and crowded according to Australian standards, though slums have been eradicated. In the country the old hovels of the peasantry are now in most districts deserted, a migration having taken place to the communal farm centres, where a house for each family is the usual thing, along with an acre or two for pigs, fowls and the like.

Working Conditions.—Working conditions on the whole are good. Free criticism by the workers themselves is allowed, and it is admitted that suggestions from this source have been responsible for the remarkable decrease in the number of industrial accidents; for example, between 1929 and 1932 there was a drop of 43.6% in quarries and coal mines. The trade unions administer the national insurance funds, and full

wages are paid during absence due to accident or sickness. Through his trade union, a convalescent worker may be sent to the Crimea, a favourite holiday resort. The old-age pension is paid at the age of sixty years and is equal to half wages, as far as I have been able to ascertain. Miners and chemical workers are pensioned at the age of fifty years, but may still work if they wish. In many factories there are short intervals every hour or so for physical exercises.

Research.

The governmental attitude towards science in the Union of Soviet Socialist Republics is not affected by the fear either of over-production or of unemployment. Of these twin evils the latter in the Union of Soviet Socialist Republics simply does not exist: the former is extremely unlikely in a planned economy. Science therefore is welcomed, and a much larger proportion of the national income is spent on research in the Union of Soviet Socialist Republics than is the case in any other country. Many of the research institutes were put into operation as early as 1917. Nowadays research itself is planned, and if any subject appears to be neglected, a new institute is endowed; this applies, of course, not only in medicine, but in all other fields of science, and notably in agricultural and industrial science.

In the field of medicine there are no less than eleven stomatological institutes, a central institute of Röntgenology (founded in 1918), the Leningrad Institute of the Brain (founded in 1918), the Leningrad Institute of Experimental Medicine (Pavlov) and the Moscow and the Leningrad Institutes of Endocrinology, among others. A campaign against rheumatism is in progress, and there is an institute of hæmatology and another of dietetics.

Plans have been made for a whole city to be built expressly for the study of the science and the art of health, and a start has been made on its building. The cost of this, spread over ten years, will be 150 million roubles. Doctors, nurses and research workers will number some 5,500. The number of patients will be strictly limited, the aim being an absolutely comprehensive survey of each case. One of the most interesting and promising features will be the clinic of the healthy man, a subject hitherto almost completely neglected by our profession.

The Institute of Hæmatology has considerably advanced the knowledge of transfusion technique, and of blood collection and storage methods.

The Institute of Dietetics supervises as part of its work in Moscow a public eating house for patients needing special diets. A very wide range of choice is there available for diabetics and the like.

I shall conclude by suggesting to you one or two books which you will find useful if you desire to follow up the subject of tonight's talk. No student of the Union of Soviet Socialist Republics should fail to read the comprehensive volumes of Sidney

and Beatrice Webb, "Soviet Communism: a New Civilization?"; this is brought up to date by the recent publication of P. Sloan's "Soviet Democracy". Of books dealing more with medical subjects, Newsholme and Kingsbury's "Red Medicine" is regarded as the classic; Julian Huxley's "A Scientist amongst the Soviets" is short, light and interesting; "Soviet Russia Fights Neurosis", by Frankwood Williams, I found particularly useful in the broad view it gives. Of all the shorter books, "Men, Medicine and Food in the U.S.S.R.", by Clarke and Brinton, is the meatiest. A general survey of science in the Union of Soviet Socialist Republics is made by J. G. Crowther in his book "Soviet Science".

May I finally quote briefly from Huxley. I would remind you that this was written in 1931, and that since Huxley's visit very great progress has been made.

The general impression of Russian medical work is not unlike that which one gets of Russian industry. In actual standards and level of achievement it is below ours. It is confronted with serious problems of the future, such as the training of personnel (the training of nurses in Russia, for instance, is far less exacting than with us, and yet the demand is for more and ever more); and the ignorance, superstition and rudimentary hygienic habits of the great bulk of the population. But the ordinary worker is guaranteed the best medical care when he is ill. The medical service has already done a great deal for general health: its movement is upward, and it is planned on a grand and comprehensive scale, with audacious vision.

ŒSOPHAGEAL CARCINOMA.¹

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THAT the subject of œsophageal carcinoma is worthy of discussion is shown by the survey of statistics, which, in the State of New South Wales, reveal that in the years 1934, 1935 and 1936 the œsophagus ranked fourth in order of frequency as the seat of cancer in males. The œsophagus was the seat of disease in one of every twenty-five cancer deaths in males; and one of every 242 deaths in males from all causes was due to cancer in this region. As opposed to a yearly average of 56 males, there was an average of only 16 females who died of this disease. Males appear to be very rarely affected under the age of forty. I have, however, seen post-cricoid cancer in a woman aged twenty-seven years, and a patient aged thirty-two years with peri-œsophageal cancer.

Pathology.

Carcinoma of the œsophagus is almost always a squamous epithelioma, often of a baso-cellular type, such as is known to be highly sensitive to radium; but rarely it may be an adenocarcinoma arising

¹ Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

from glandular structures, and this form usually occurs in the lower third.

Mailer describes three definite pathological types: (i) The bulky polypoid type of growth, which extends into the lumen of the œsophagus, causing obstructive symptoms at an early stage. (ii) The shallow ulcerating type, causing early symptoms of mediastinal involvement, such as pain and back-ache. Metastasis and obstructive symptoms may be absent. (iii) The hard, infiltrating scirrhus type, which affects the œsophageal wall, encircles the lumen, causes fixation of the walls and produces obstruction.

In the earlier stages, direct œsophagoscopy may reveal only an area of induration or proliferation, slightly narrowing the lumen, or more fixed than the adjoining œsophageal walls, but in the advanced stage there is usually seen ulceration with cauliflower edges, the soft mass even filling the lumen and bleeding easily. Less frequently, the hard, fibrous, scirrhus type of stricture is encountered. The tumour may be three or four inches in length, sometimes more.

Lymph glands are involved in about half the cases, and it is estimated that 50% of these neoplasms occur in the lower third of the gullet.

McGibbon states that their mode of spread is by (a) direct extension, (b) lymphatic permeation and embolism, (c) blood stream, (d) implantation.

Virulence.

Cancer of this region can no longer be regarded as "a local process of a relatively low degree of malignancy". That metastasis is frequent is known, but the fact that the average patient lives only 5-3 months after intubation or 3-6 months after gastrostomy no doubt masks the true extent of such metastasis during life. From observation in recent years the evidence points to more early and frequent metastases than was thought formerly.

Grey Turner has stated that "in the œsophagus, as in other parts of the body," malignant disease varies in type and behaviour. Vinson, reviewing 1,000 cases, concludes that "the condition is very highly malignant, as indicated by its rapidly progressive clinical course". Roberts found that "the gravity of the case bore a definite relationship to the proximity of the tumour to the mediastinal lymph glands, particularly to the tracheo-bronchial group". Clayton states that in 21 of 41 *post mortem* examinations he found metastases below the diaphragm, and in eleven of these the liver was involved. Souttar reports macroscopic secondary growths in 8 cases out of 18 *post mortem* examinations. Watson found macroscopic secondary growths in 14 cases among 27 *post mortem* examinations. Broders and Vinson found them in 27 cases among 42 examinations. What the combined figures for macroscopic and microscopic growths would be cannot be envisioned.

Grading by Broders's method shows these tumours to be mostly of a highly malignant type, Grade III and Grade IV.

Clinical Course.

An insidious onset without pain is characteristic of the early stage. Dysphagia is the first symptom in over 90% of cases, by reason of the protrusion of the tumour within the lumen of the gullet, and at this late stage the patient is usually submitted for routine examination. With the steadily increasing dysphagia there is an increased secretion of frothy mucus, the presence of which is of diagnostic value.

Pain is not usually an early symptom, but a reflex spasm which results from attempts at swallowing may lead to acute discomfort. In a few cases, however, the earliest sign may be a feeling of slight pain on swallowing and a sensation of having a lump behind the sternum.

In growths in the vicinity of the cardiac orifice there may be flatulent dyspepsia, fullness after meals and eructation of gas. In such cases the growth may have arisen in the stomach and crept upwards through the cardiac orifice into the gullet. In the late stages pain may be an important feature.

Evidence of involvement of the recurrent laryngeal nerve or of the tracheo-bronchial system is rarely seen in the early stages.

The onset and progress of the dysphagia is insidious or intermittent, and the patient unconsciously masticates more thoroughly and takes softer foods. Valuable time is lost at this stage, and Jackson records that in 87 of 110 cases of carcinoma of the œsophagus an inferential diagnosis of a neurotic condition had previously been made. At this stage the patient may be treated for "nervous spasm" or "dyspepsia".

It is estimated that the average period between the onset of symptoms and diagnosis is almost six months, and in some cases longer.

Importance of Early Diagnosis.

The advanced stage in which this disease is diagnosed is universally deplored. For the purpose of this discussion a survey of the records of 100 cases was made from the records of the Radium Clinic, Sydney, the Royal Prince Alfred Hospital, and private sources. It was revealed that in each case the disease was already in an advanced stage when first presented.¹

Because of the late presentation of the patients the skiagrams usually demonstrate a characteristic obstruction; but what is the earliest stage at which carcinoma can be demonstrated by radiological methods? D. R. Patterson has stated that the ordinary method of filling out the canal with barium paste is no longer sufficient, and that for the delineation of the mucosa, relief representation, as practised by Schatzki, is indispensable. By using barium in small quantity and of suitable consistency, folds and irregularities of the mucous surface, varices and small ulcers *et cetera* are outlined. The

¹ At this stage Dr. Halloran showed the skiagram of a woman, aged fifty-two years, illustrating one of these cases. He pointed out that the condition was a typically advanced carcinoma with symptoms of only six weeks' duration. At the stage illustrated the patient was unable to swallow even water.

administration of a small dose of atropine, by drying the mucosa and slowing down movement, reduces the speed of passage through the upper orifice and permits more careful observation. Another striking development is the air relief representation of Palugay, a combination of the relief method with the presence of air in the canal.

The actual value of these methods, and to what degree they may further an earlier diagnosis than is obtainable with the present methods in use, is a matter on which enlightenment is sought.

It is suggested that all patients over the age of forty-five years with persistent symptoms of one month referable to the upper digestive tract should be examined for this disease if earlier diagnosis is to be made. Moreover, such patients should be examined by direct œsophagoscopy as well as by X rays, even if the radiological examination reveals no abnormality.

J.M., a male, aged sixty-three years, was seen on November 22, 1932. He gave a history of having been examined by X rays twice in a country town in the previous twelve months with a negative result, but X ray examination two weeks previously revealed a permeable stricture of the œsophagus, and the report on the biopsy snipping was squamous epithelioma.

The advent of a carcinoma-minded profession might hasten an earlier diagnosis in carcinoma of the œsophagus, as it has done in bronchogenic carcinoma.

In the absence of any early diagnostic syndrome, however, can we hope to enunciate any early symptoms, due, for example, to an early nervous reflex in the œsophagus? Irregular peristalsis of the œsophagus can be demonstrated, as is illustrated in the following case at the Sydney Hospital, for the notes on which I am indebted to Dr. D. G. Maitland.

X ray examination of this patient revealed œsophageal dilatation, with a regular, apparently spasmodic contraction at the cardiac-œsophageal junction. Food and fluid were present in the œsophagus at the time and, on giving the barium meal, contraction of the œsophagus as a whole was noted, with a form of peristaltic contractions. These ceased and a general spasm occurred, in which portion of the meal was vomited, or, rather, overflowed from the already full œsophagus.

The dysphagia of long standing had increased just prior to X ray examination.

Subsequently he was again submitted to X ray examination and three opinions were obtained. All corresponded with the original diagnosis of cardiospasm. About nine months later a *post mortem* examination was carried out and a carcinoma, circular and smooth in outline, was found causing the obstruction at the cardio-œsophageal end.

Would a further series of studies of irregular peristalsis lead us to an early diagnosis? Would X ray cinematography assist in this regard? And, if practicable, would its use be economical?

Serological Test.—Cronin Lowe has found, by his modification of the Bendien test, that patients with carcinoma of the œsophagus show more pronounced positive serological reactions than do patients developing carcinoma elsewhere. From his reactions to this test he suggests that carcinoma of the

œsophagus may develop insidiously to a greater degree of malignancy before clinical diagnosis is obvious than is the case in the development of carcinoma in other areas referred to by him.

What is the value of the serological test for carcinoma of the œsophagus in the early stage?

Data Gained from Œsophagoscopy.

Stress should be laid on the importance of (a) biopsy snipping for pathological report, (b) the degree of permeability or otherwise, (c) the exact site and length of the stricture. On these data one is able to name the type of tumour and to gauge its radio-sensitivity or resistance. Impermeable strictures are usually beyond the aid of intubation and access cannot be gained to their lower borders. In some cases in this series, when better delineation of the lower border was desired, the stricture was dilated sufficiently to admit a fine steel tube, through which a thin barium fluid was then injected below the stricture and an immediate X ray picture was taken, the patient lying on the back, the foot of the table raised to such an angle that the barium gravitated towards the stricture.

J.S., a male patient, was seen on April 6, 1933. A pre-operative barium meal showed the upper limit of the lesion opposite the fifth intervertebral disk. A post-operative film with the use of barium showed the lower limit of the lesion opposite the seventh intervertebral disk. The length of the malignant condition was 4.7 centimetres.

Malignant disease, superimposed on achalasia, or stricture as a pressure phenomenon from the adnexa may be detected.

Carcinoma and a syphilitic lesion may be coincident, as in the following case.

T.H., a male, aged fifty-eight years, complained of dysphagia for about five months. X ray examination revealed a filling defect just below the aortic arch. Œsophagoscopy revealed a tumescence and constriction ten and half inches from the incisor teeth, believed to be syphilitic in origin. It was not ulcerated and a biopsy was not taken. The Wassermann reaction was positive, "+++", and the Kline test gave a positive, "++", reaction.

During the ensuing six months he underwent a course of antisyphilitic treatment without improvement, and X ray examination then revealed almost complete obstruction, which was confirmed by œsophagoscopy. The biopsy report was "squamous epithelioma, Grade 1, Broders". The Wassermann reaction was still positive, "++".

The attached table illustrates the combined findings in a series of cases. It will be noticed that in three of these the Wassermann reaction was triple positive, and that in two of these three the biopsy report was squamous epithelioma. The Wassermann test must never be omitted.

The following is a case of uncomplicated syphilitic stricture.

R.M., a male, aged sixty years, complained of dysphagia for four months. X ray examination revealed narrowing and irregularity of the middle third of the œsophagus, very suggestive of carcinoma. Œsophagoscopy was performed and the findings were "carcinoma of left lateral wall of middle third of œsophagus, two by one and a half inches, with small ulceration of its upper part". It was suggested

Table Showing Details of Typical Cases of Oesophageal Cancer.

Patient's and Date.	Sex and Age.	Operation.	Location.	Biopsy Report.	Permeable.	Result of Wassermann Test.	Remarks.	X Ray Report.
F.B. 11/2/1929	M. 71	Oesophagoscopy.	Post cricoid.	Squamous epithelioma.	No.	No reaction.	Aortic aneurysm. Paralysis of the vocal cord. Marked enlargement of both lobes of the thyroid. Died	Malignant stricture.
G.H. 19/8/1929	M. 73	Oesophagoscopy.	Cardiac orifice.	Not stated.	Yes.	"+++"	Did not resemble cancer, more fibrous.	Malignant stricture.
J.B. 4/3/1930	M. 46	Oesophagoscopy.	Angle of Ludwig.	Squamous epithelioma.	Yes.	"+++"	Novarsenobenzol given; radium and X rays applied.	Malignant stricture.
C.B. 18/12/1931	M. 68	Oesophagoscopy.	Sixth thoracic vertebra.	Squamous epithelioma.	No.	"+++"		Malignant stricture.
W.B. 24/11/1930	M. 65	Oesophagoscopy.	Three inches above cardiac orifice	Squamous epithelioma.	Yes.	No reaction.	Ulcerated.	Malignant stricture.
C.W. 11/4/1932	M. 62	Oesophagoscopy. Cauliflower ulcer.	Cardiac orifice.	Squamous epithelioma.	?	?	Gastrostomy; now requests intubation.	Malignant stricture.

that the condition might be a mediastinal growth beginning to involve the oesophagus. Later, the Wassermann test gave a "+" and the Kline test a "+++" reaction. Four years later the patient was alive and well and his stricture was being occasionally dilated.

Obviously the stricture was not malignant.

Treatment.

Oesophagectomy has been successfully achieved and a technique has been evolved which has been successfully applied in rare cases. It is regrettable, however, that more post-operative information is not available over the usual five-year period on the psychological condition of the patients as well as on their physical state.

The oesophagoscopist should be ever on the watch for suitable cases for oesophagectomy and should evaluate the findings in each case, so that the few patients whose tumours are suitable for excision should be sent to a surgeon who has developed a technique in this region.

In the advanced stage in which these patients' condition is diagnosed, however, almost all will be found to be unsuitable for anything but palliative treatment, by virtue of their age, poor general condition, site of tumour, metastases, or secondary invasion of the tracheo-bronchial system, or other complications.

Intubation is, then, a palliative measure, which is undoubtedly superior to gastrostomy, the latter being recommended only when intubation is impracticable, and then it should be performed early.

Although evolving since the eighties, it is only during the last ten years that Souttar's technique of intubation has become widely known.¹ Occasionally the tube, after dilating a loose stricture, passes onwards to the abdomen. When oesophageal obstruction recurs, therefore, the abdomen should be examined by X rays and the tube located. In one case in this series the tube was held up at the ileo-caecal valve for a period of two months before being passed. Its presence in the bowel is usually symptomless.

¹ At this stage Dr. Halloran showed skiagrams illustrating the use of Souttar's tubes. In one instance a patient lived for twenty and in another for eleven months with intubation but without gastrostomy.

In some instances the proliferating growth within a few months tends to overgrow the top of the tube, thereby fixing it. In one instance the tube was quite fixed and irremovable in four months. As it is desirable that a tube should be removed, cleansed and replaced at any time, it is wise to remove and cleanse it at intervals of, say, four months, lest fixation occur.

It is known that intubation is unsatisfactory for growths at the upper and lower ends of the gullet, such as in post-cricoid carcinoma and growths spreading upwards through the cardiac orifice. Should the site of the cancer be unsuitable for intubation, then recourse must be had to gastrostomy, and this should be undertaken early.

Since intubation became established, electro-coagulation has been abandoned.

Post-Cricoid Carcinoma.—In post-cricoid carcinoma it is known that 86% of the patients are women. Attention has recently been called to its possible relationship to the Plummer-Vinson syndrome of dysphagia, achlorhydria and hypochromic microcytic anemia, both diseases usually affecting women between the ages of thirty and fifty. Should post-cricoid carcinoma be regarded as a sequel in patients exhibiting this syndrome, then preventive treatment on medical lines is indicated.

K.M., a female patient, aged fifty-two years, one of the patients in this series, complained of dysphagia for five years and was then shown to be suffering from a post-cricoid carcinoma. Her blood picture during those five years is not known. She was not investigated for the Plummer-Vinson syndrome, but her dysphagia could not have been due to carcinoma over this five-year period.

Carcinoma in the cervical oesophagus may be temporarily improved by radium applied as a neck collar.

Colle and Allechin conclude that a combination of X rays and radium increases the radio-sensitivity of the tumour and leads to retrogression. Surgical excision is possible in rare cases, but in almost all gastrostomy becomes necessary.

Radium Therapy.

No cures as a result of radium therapy can be reported at the Royal Prince Alfred Hospital, and

at the moment treatment either by radon seeds or needling is in disfavour. The methods tried in that clinic were described in THE MEDICAL JOURNAL OF AUSTRALIA of February 11, 1933.

The mental picture of a carcinoma should be neither that constantly seen in the skiagram nor that viewed through the œsophagoscope, for these delineate merely the lumen of the gullet invaded by a large tumour whose distal borders cannot be demonstrated or envisioned. Moreover, its lymphatic spread is unknown. Even could the whole tumour be delineated, it is doubtful whether penetration of its distal outlying portions could be effected without cell-caustic effects, which are hazardous. For these reasons a satisfactory radium technique has still to be evolved.

The work of Guisez, of Paris, is worthy of notice, however. He used 100 to 120 milligrammes of radium bromide, screened by 1.5 millimetres of platinum, inserted every two days for ten to twelve hours. About six treatments in all were given. Of 270 patients treated in this way, 30 lived for more than 18 months, and of these, one survived eleven years, one ten years, and one five years.

Other methods used, for example, Symond's tube, and radium drawn up through a gastroscopy wound into the growth by the endless thread method, have proved unsatisfactory.

Bomb therapy has also been on trial, but the results are not known.

X Ray Therapy.

Protracted fractional X ray treatment is now on its trial. Baum, of New York, reports a six-year survival in a case in which the biopsy revealed squamous-cell carcinoma. F. Roberts, of Cambridge, describes a three-year survival, using a "strip field" method of X ray therapy. The Cancer Research Department of Saint Bartholomew's Hospital, reporting on its 1933 and 1934 cases, states that:

In both series serious lung injuries seem to have been effectively avoided, but it will be seen that the percentage of primary disappearances of the growths (8 out of 26) is very much lower than in the 1933 series. The work is still being continued along these lines.

There is much food for thought in a paper recently published by Eddy, physicist to the Commonwealth X Ray and Radium Laboratory. Eddy states that the action of mixed radiations may have important biological consequences, and quotes the case of a lecturer who used X rays to demonstrate the bones of his hand and later placed the hand in the field of a high frequency oscillator. He suffered from a severe radiation burn. It has been suggested that the energy of the radiation absorbed in the tissues was suddenly released by the high frequency radiation, giving rise to an enhanced biological effect. Could therapeutic use be made in the œsophagus of these mixed radiations, if controlled?

Neutrons discovered by Chadwick in 1932 may be produced by bombarding beryllium with α particles or with the harder γ rays from radium or radon, and thereby a biologically active radiation is produced.

Boron, cadmium and certain rare earths are good absorbers for the slower neutrons. This would open up the possibility of introducing a highly selective element into a deep-seated tumour and then irradiating with neutrons.

Exceedingly intense sources of neutrons have been produced by the ionic bombardment of beryllium. Could such bombardment be attained by the introduction into a stricture of beryllium and radon?

And lastly, to what extent can the body tissues be made more radio-sensitive by the introduction of certain chemical substances?

These are questions the immediate answer to which is impossible, but it is well to remember that future research into the nature of matter and the action of newly discovered radiations upon biological material must not be neglected by the clinician, because they may open up new and hitherto untrodden avenues in the treatment of disease.

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MALIGNANT DISEASE OF THE ŒSOPHAGUS.¹

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THE throat surgeon will find the cooperation of a skilled radiologist of the greatest assistance in the investigation of pathological conditions of the œsophagus.

In the study of œsophageal lesions two methods of examination are of the greatest value, namely, the radiological and the œsophagoscopic.

Investigation by the use of bougies is an extremely dangerous procedure, as it is very easy for the bougie to pass through an inflamed or ulcerated surface and down for several inches beneath the submucous coat, reaching even as far as the cardiac orifice without the operator being aware of the fact. Barclay, in his book "The Digestive Tract" (1936), reports four such catastrophes (all proved by *post mortem* examination) in one year.

¹Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

The swallowing of an opaque bolus not only outlines the œsophageal tube, but also allows of a study of the surrounding structures, such as the aortic arch, the mediastinal contents and the lung fields. For this reason the X ray examination is likely to give greater help than the endoscopic method, as with the latter only those lesions which involve the mucosal lining are readily accessible. Of course, both these methods should be combined, the radiological examination preceding the endoscopic.

In making examinations of the œsophagus a definite routine should be followed in all cases. One of the most important parts of any fluoroscopic examination is that the observer's eyes should be thoroughly accommodated to darkness; after proceeding from daylight to the dark-room it is absolutely necessary to sit in complete darkness for fifteen minutes before proceeding to use the fluoroscopic screen. This time should be measured by the clock; a good rough test consists in watching the luminous dial of a wristlet watch and, when the figures appear dazzlingly bright, the screening may be commenced.

Attempts at fluoroscopy before proper visual accommodation are not only a waste of time, but also they expose both the observer and the patient to unnecessary danger from high-powered radiation and place undue wear and tear on delicate and expensive apparatus.

Before proceeding to the study of the œsophagus itself the clinician should make a quick fluoroscopic examination of the chest with the patient in various positions; in this way aneurysms may be noticed, and also various alterations in position of the œsophagus, due to mediastinal or pulmonary complications. The X ray examinations may take three forms: first, a mixture of barium sulphate and mucilage, of the consistency of thick porridge, is taken and its passage to the stomach is observed; secondly, a fluid meal is given; and, thirdly, a biscuit is eaten and a further examination is made with the fluid meal. This third procedure often irritates an inflamed area and causes spasm which can be noted on the screen. The swallowing of opaque capsules for diagnosis is very misleading, as they act as foreign bodies and may cause local spasm at any level, even in the absence of organic disease.

Most radiologists make their examination with the patient in the so-called right anterior oblique position, that is, with the tube placed posteriorly and the patient rotated to the left with the screen over the right breast. I prefer the exact reverse to this position, that is, the left posterior oblique position, as this gives a "closer-up" view of the œsophagus and allows the patient to manipulate the glass of opaque meal with less danger of interference with the screening apparatus. In this position the patient stands obliquely facing the tube, with the right shoulder against the stand and the screen posteriorly to the left scapula, the left hand thus being free to manipulate the meal.

In some cases the examination is made with the patient's head lower than his feet, that is, deglutition is performed "up hill". In this position the patient sucks the opaque meal through a rubber tube, and as this position slows up the act of deglutition, it allows of greater time for the study of the act. The process of deglutition is a very complex one and may be divided roughly into two stages, namely, the passage from the mouth to the level of the clavicle, and the passage from this level to the cardiac orifice. The first part is accomplished in a very quick time (about one-tenth of a second), but the second part is a rather leisurely procedure and the progress of the bolus may be followed quite easily.

There are no definite points of constriction in the œsophagus; the œsophagus is just a regular tube in which at times peristaltic waves may be seen. There is usually some pressure from the aortic arch, and there is always a slight hesitancy above the cardiac orifice; and it will be seen that a certain amount of the meal collects in the œsophagus before dropping rapidly into the stomach. A peculiar wave-like action is seen in the lower part of the œsophageal tube, which is due to transmitted impulses from the heart's action and from the respiratory movements.

Innocent strictures of the œsophagus are rare, and there is generally an antecedent history of injury, for example, swallowing of corrosives or foreign bodies. Such strictures are smooth in outline and do not show the ragged outline seen in malignant disease.

œsophageal pouches are not uncommon, and usually occur high up in the œsophagus. They are generally easy to demonstrate and only occasionally undergo malignant change.

Malignant disease may occur at any level, and gives rise to symptoms of progressive obstruction. Symptoms are more rapidly noticed when the lesion is situated high up than when it is situated in the lower œsophagus, as the lower half of the œsophagus is very loosely suspended, and dilatation may take place without causing pressure effects on other structures. In lesions situated at a high level it is frequently found that attempts at swallowing are followed by regurgitation of the meal into the larynx and trachea with violent coughing, and only a small part of the meal will pass through the stricture. This regurgitation into the larynx does not occur when the obstruction is due to simple spasm or to incoordination of the pharyngeal constrictors.

The typical appearance of a malignant stricture is a dilated œsophagus above the site of obstruction, with a somewhat fusiform lower outline; below this, a ragged shadow of opaque material may be noted dribbling through the narrowed section occupied by the growth.

In less well-established cases there may be merely some spasm, with irregular œsophageal outline. This spasm will remain constant at repeated examinations, and the œsophagoscope will reveal a super-

ficial lesion at the level of the spasm. (Esophageal spasm is unaffected by the administration of belladonna.

At the cardiac orifice the diagnosis between malignant disease and cardiac achalasia becomes a very difficult matter. It will generally be found possible to demonstrate the malignant section, but at the cardiac orifice itself this may be impossible. In cardiac achalasia the dilatation of the oesophagus is generally of far greater extent than is ever seen in malignant disease.

In achalasia the meal may be held up completely and then suddenly there is a relaxation at the cardiac orifice and a large quantity of meal drops through into the stomach, to be followed again by a complete cardiospasm.

In obstruction from achalasia the patient may take a complete meal and then suddenly return it. This does not occur in malignant disease.

In advanced malignant disease ulceration may occur into a bronchus or into the pleural sac. At times a foul empyema may be the first symptom of an advanced malignant growth of the oesophagus.

Transdiaphragmatic hernia of the stomach or a short oesophagus with the cardiac orifice above its usual position may cause trouble in diagnosis, but the experienced observer will have little difficulty in recognizing these conditions.

There is one other way in which fluoroscopy may be of help in malignant conditions of the oesophagus, and that is as a help in placing radium needles in position. This procedure may be carried out under the screen, and repeated examinations will show whether these needles remain in position.

THE RADIATIONAL TREATMENT OF OESOPHAGEAL CARCINOMA.¹

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DEPRESSING as it may sound, I shall begin this article with a quotation from the pathologist Boyd, who, writing of carcinoma of the oesophagus in his "Textbook of Pathology", states: "The diagnosis is seldom made until the disease is advanced, and the prognosis is hopeless." So far there have been evolved but two methods of treatment for oesophageal carcinoma, namely, surgery and radiotherapy, and no matter which method we employ, the outlook would appear to be hopeless. But though the prognosis is so bad and practically all such cases have inevitably a fatal issue, this is no reason why any and every mode of treatment should not be exploited which might in any way mitigate or palliate this grave malady.

Others will deal with the surgical treatment of oesophageal carcinoma—an heroic measure in almost all cases in which it is attempted; I shall confine my few remarks to its treatment by radiational methods. And at the outset I think it can be said definitely enough that the justification of radiotherapy lies in its palliative effect in many cases of carcinoma of the gullet. Though it is probably too much to look for a cure in any such case, the proportion of cases which show definite improvement in the primary lesion, with corresponding mitigation of symptoms, such as dysphagia, justifies the use of radiation therapy in this hopeless condition. In short, oesophageal carcinoma is a fatal disease, but in a percentage of cases dysphagia may be relieved, the patient may be made more comfortable, and in some cases his life may be prolonged.

I shall first deal briefly with the several methods which have been tried in the irradiation of oesophageal growths, and shall then attempt to give reasons why such tumours, though mostly radio-sensitive in type, respond so badly to radiotherapy. On the whole, one can take it that the results of any form of radiotherapy leave much to be desired in these cases; palliation is the most one can hope for. In discussing the probable reasons for this failure to respond to irradiation on the part of such growths—their lack of radio-responsiveness, as it might be called—it will be necessary for me to touch briefly on what I call the essential prerequisites of successful radiotherapy. There are at least five or six of these prerequisites, and it will be seen that with the vast majority of oesophageal carcinomata only half, or at most two-thirds, of these criteria are satisfied.

By far the majority of carcinomata of the gullet are of the epitheliomatous or so-called epidermoid type, in which the tumour arises directly from the epithelial lining of the gullet. Much more rarely the growth may be adeno-carcinomatous in type. Of the common epitheliomatous variety, the majority of cases belong either to Grade III or Grade IV (Broders's classification); that is to say, they are relatively quite a radio-sensitive type of tumour. And were this factor of radio-sensitivity the sole criterion of success in radiotherapy, one would expect to get a much better response and much better clinical results from the irradiation of these oesophageal growths than are actually obtained. But, as will be seen later, there are other and equally important factors or prerequisites which must be considered along with the factor of radio-sensitivity in any assessment of the probable response of a particular variety of tumour to irradiation.

Methods of Treatment by Irradiation.

Methods of irradiation may be divided into internal or intracavitary, and external or transcutaneous. Many different techniques have been tried in each method; some have now been abandoned, others have survived that test of all tests, the test of time. Of the internal or intra-

¹ Read at the fifth session of the Australasian Medical Congress (British Medical Association), August, 1937.

cavitary methods, there have been two main varieties exploited: (a) the method of intubation, whereby radium or radon tubes (usually enclosed in rubber or vulcanite) are inserted into the lumen of the œsophagus and placed in as close apposition as possible to the tumour mass; and (b) the implantation method, whereby radium needles or radon seeds are inserted interstitially, with the help of an œsophagoscope, into the actual tumour tissue itself in the gullet wall.

These intracavitary methods have been given a good trial, but on the whole, I think, have been found rather wanting; so gradually the tendency has been to discard them in favour of the external method whereby the radiant energy is administered deeply to the tumour through the skin. By this method the distribution of energy is more even and more uniform in and around the primary growth. There are also two methods of external radiation: (a) by the use of deep or penetrating X radiation, which is the commonest method employed at present (by radiotherapists at least) in œsophageal carcinoma; or (b) by the use of that concentrated source of radiant energy known as a radium bomb, which is suitable, however, only for the treatment of lesions in the upper third of the œsophagus.

In the present stage of our knowledge deep X ray therapy offers, I think, the most effective and advantageous method of treatment, and some of the best results so far in the treatment of œsophageal carcinoma by radiotherapy have most certainly been obtained by the use of deep X radiation, as practised, for example, by Levitt in his department at Saint Bartholomew's Hospital, London.

For any method of treatment it is necessary to determine as accurately as possible the site and extent of the growth, and for this, of course, diagnostic radiology (both radiography and radioscopy) and œsophagoscopy are indispensable. The œsophagoscope will also help to confirm the diagnosis, by permitting a small section of the growth to be taken for microscopy. In this way also the type and grade of the tumour can be ascertained. (Broders graded 207 squamous-celled carcinomata of the œsophagus and found, as has been stated above, that the great majority belonged either to Grade III or Grade IV.)

The method of intubation has been used fairly extensively, and a French worker, Guisez, has reported his results in 270 cases. In most of these the treatment was but palliative, but Guisez claimed that in a number of his patients so treated life was prolonged up to ten years after the treatment. He used a bougie containing radium, and this was inserted into the œsophagus and apposed to the growth for ten to twelve hours at a time, five or six of these intubations being given, as a rule, at intervals of two days. In other cases tubes containing radon have been inserted into the œsophagus and left *in situ* for varying periods. The implantation or interstitial method, in which radium needles or radon seeds are used, has also been widely tried.

Radon seeds may be inserted into the tumour tissue through an œsophagoscope, a special seed introducer being used; but in all these intracavitary methods, whether of intubation or of implantation, the resultant energy distribution from the radium or radon source is uneven. For this reason alone (and there are other quite obvious ones) the external methods of irradiation are preferable, for example the use of penetrating X radiation and the administration of the radiant energy according to the principles of the modern fractionated and protracted method of Coutard. A maximum depth dose to the tumour site is aimed at, consistent with a minimum of damage to the intervening skin and also to the adjacent lung tissue. This is achieved by the use of multiple narrow fields in series, and of this method (deep X radiation through multiple ports) Levitt, of Saint Bartholomew's, has been one of the chief exponents and has obtained some encouraging results.

Briefly, Levitt's method (1934) was to give fairly large daily doses (60% unit skin dose) to six or eight perithoracic fields in sequence, the treatment lasting from four to six weeks, and the total dose delivered to the œsophageal tumour being in the region of 360% unit skin dose. He began to modify his treatment of œsophageal growths in 1933, and as a result of his particular technique was able to report not only the relief of discomfort and dysphagia, but also the actual disappearance of the primary lesion in a percentage of the cases he treated. His modified technique was devised to fulfil the following conditions: (i) To provide an intensity of irradiation on the œsophagus comparable with that obtained by the technique in use for similar growths in the throat. (ii) To provide a daily dose to the œsophageal tumour which should equal as nearly as possible that received by a similar throat tumour treated by the usual technique. (iii) To include a sufficient length of œsophagus, above and below the growth, in the irradiation, because of the known tendency of the disease to spread up and down the œsophagus.

So, in order to fulfil these conditions: (a) the skin-focal distance was reduced to 30 centimetres; (b) the daily surface dose of radiation was fixed at 60% unit skin dose; (c) the length of the surface field was increased to 15 centimetres, giving an irradiation of approximately 20 centimetres of œsophagus; and (d) multiple narrow fields were used (in most cases six, but sometimes eight) in order to minimize both the general effect and the local skin effect of such large daily doses. A Thoraeus filter and a kilovoltage of 200 were used in all cases. Using, as he did in 1933, radial perithoracic fields, Levitt soon found that most of his patients subsequently showed obvious signs of pulmonary fibrosis (dyspnoea, cough, expectoration *et cetera*), which condition was confirmed by radiographic examination. As these lung sequelæ were undoubtedly due to the X ray technique, Levitt has since modified his original technique without material alteration of its main features.

The dose to the oesophageal lesion may advantageously be delivered, in my opinion, through six narrow ports or fields, one direct and two oblique ports, both anteriorly and posteriorly. The direct or mediastinal fields (in the case, say, of a tumour about the middle of the gullet) are known as the anterior or sternal, and the posterior or vertebral, while the oblique fields are called the left and right parasternal and the left and right paravertebral. By using these six fields, I think the damage to lung tissue is minimized, even though there may be relatively more skin effect than with the perithoracic fields. Levitt's encouraging results (relief of dysphagia in most cases; regression of the primary tumour in some) indicate, I think, that his technique marks a definite advance on previous methods of irradiation in oesophageal carcinoma.

Reasons for the Poor Response to Irradiation.

Before I proceed to enumerate and discuss the essential prerequisites of successful radiotherapy, or what might be called the criteria of radio-responsiveness, there are one or two more obvious points to make on this question of the poor response of oesophageal tumours to irradiation. The commonest site for such carcinomata is the middle third of the gullet; the next most common site the lower third; and the least common site is the upper third of the oesophagus. Wherever they occur, however, as the surgeon knows only too well, they are all notoriously inaccessible so far as his scalpel is concerned; they are also, though of course to a much less extent, relatively deep or inaccessible from the viewpoint of the radiotherapist. It is manifestly much easier, from the technical point of view, to irradiate a superficial and quite accessible carcinoma of the lip, for example, than a much deeper and less accessible carcinoma of the hypopharynx or oesophagus.

And again, just as the neighbourhood of very important structures and organs complicates the picture of an oesophageal neoplasm from the point of view of the surgeon, so does the proximity of the lungs, with their susceptibility to fibrosis after irradiation, complicate the problem of the radiotherapist. As a rule, too, in oesophageal carcinoma there is early metastatic extension to the regional lymph nodes (cervical, mediastinal and abdominal groups), as the gullet has relatively a good blood and lymphatic supply, or, in other words, good irrigation and drainage. When it is remembered that, as Boyd says, "the diagnosis is seldom made until the disease is advanced", one will realize that a case of carcinoma of the gullet is seldom seen in which there is not already secondary nodal extension (if not even distant metastatic involvement), a clinical fact which aggravates both the prognosis and our therapeutic difficulties, both surgical and radiotherapeutic.

This question of the stage of the neoplastic process—a most important consideration always—leads me directly to a brief consideration of the important factors which make for success in radio-

therapy. These essential prerequisites may be enumerated thus: (a) an early stage of the neoplastic process (preferably Stage I, that is, without extension to the regional lymph nodes); (b) radio-sensitivity of the tumour; (c) a satisfactory state of the tumour bed (that is, of the supporting and surrounding tissues); (d) absence of infection or sepsis; (e) adequate irrigation, that is, a good blood supply; and (f) adequate drainage, that is, an unimpaired lymphatic supply. I shall discuss these essential prerequisites in the order in which I have enumerated them.

An early stage of the neoplastic process is an obvious prerequisite; it is as important in radiotherapy as in surgery that the lesion be in at least a comparatively early stage when it is first seen. And in this regard I might mention here that often far too much is expected from radiotherapy (and radiotherapists) by medical men who refer patients with advanced malignant disease (late Stage II and Stage III cases) for radiational treatment. In many so-called comparisons of the results of surgery and radiotherapy, with alleged deductions as to their relative merits in carcinotherapy, this fallacy has been obvious, namely, that writers (and others) have attempted to compare the results of surgery in a Stage I carcinoma with those of radiotherapy in a similar neoplasm at a much later stage (Stage II or even Stage III). Such a "comparison", having no common basis of comparability, is quite worthless, and it is time that this fallacy, with its resultant unsound and illogical inferences, was realized by all concerned. It is as important for the radiotherapist as it is for any other therapist in medicine to see the condition and to treat it in its earliest possible stage; and only when he is given a chance to do this will it be possible, fairly and logically, to compare the results of surgery and radiotherapy in the treatment of malignant disease.

Tumour radio-sensitivity is another obvious prerequisite; it is self-evident that the more sensitive a tumour mass is to the impact of radiant energy, the more likely will be a satisfactory clinical result. But one must immediately qualify this statement by a reservation (again of importance in comparing the results of surgery and radiotherapy), namely, that the most cellular and anaplastic tumours being for that reason the most radio-sensitive, are for the same reason the most malignant. The prognosis in radiotherapy is therefore always coloured by this fact, that extreme radio-sensitivity means always a high degree of malignancy. This is best seen perhaps in the case of a lymphosarcoma, one of the most sensitive to irradiation of all tumours, and, as we all know so well, one of the most fatally malignant.

The satisfactory state of the so-called tumour bed or of the surrounding and supporting tissues of the neoplasm is, in my opinion, of paramount importance, for the tumour bed is intimately bound up with what we call the indirect effect or biological action of radiations. For, apart from the direct or sheerly destructive action of powerful energy

forms, such as X and γ rays, on the cells of a malignant tissue, there is the equally important indirect or biological action always to be considered. By this, as a result partly of the actual destruction of the neoplastic tissue (not necessarily of all of it, however) and partly of the hyperæmia and probable extravasation of blood from the very small vessels in the tumour bed, there is induced that wonderful series of biological changes which constitute the fibroblastic or healing reaction and which end ideally in perfect healing of the diseased tissues. This is what Cramer calls the "macrophage reaction", that monocyte-fibroblast-fibrocyte-fibrous tissue sequence which is of such great importance in the healing process of any malignant neoplasm.

The absence of superadded infection is important also for a good result; it is a radiotherapeutic commonplace now that an infected or septic lesion takes much longer to heal (if it heals at all) than a clean, non-infected one.

Good, adequate irrigation and drainage are, finally, of great importance in radiotherapy. They are bound up to some extent with the state of the tumour bed, for there must be good blood supply and lymphatic drainage if the biological action and effects of irradiation are to operate to the greatest advantage. This has been proved time and again by radiotherapists (and sometimes, but less consciously, by surgeons) in carcinotherapy.

Now if, considering the commonest or epidermoid type of œsophageal carcinoma, we run through these essential criteria, we find that half of them, or at least a third, remain unsatisfied. The ordinary squamous-celled carcinomata of the gullet are relatively radio-sensitive (mostly Grade III or Grade IV) and they have a fairly good blood supply and a rich lymphatic drainage (the last-mentioned is really too good from the viewpoint of early nodal extension); so, from these aspects alone, such tumours should respond well to irradiation. But, on the other hand, they are in almost every case well advanced when first seen (either in Stage II with definite nodal involvement, or Stage III with distant metastases); seldom if ever do we see an early or Stage I case of œsophageal carcinoma. Also, they must often, because of their advanced stage, exhibit evidence of superadded infection, and, lastly and perhaps most important of all, they have a poor, thin and miserable tumour bed to support them. They have not the good, substantial and comfortable tumour bed of, let us say, a carcinoma of the lip; and so, like the carcinomata of the pharynx and rectum (all in the wall of a comparatively thin hollow tube), they are not radio-responsive. One need only mention by comparison the radio-responsiveness of the squamous-celled carcinomata of the lip, of the tongue and of the *cervix uteri*, similar in type and so in actual radio-sensitivity, but with such different and excellent tumour beds. These, then, are the three necessary conditions which œsophageal growths fail as a rule to satisfy. And when we add to these the three anatomical or structural reasons already mentioned, namely,

their relative inaccessibility, their early extension through a rich lymphatic drainage system to the regional lymph nodes, and their proximity to vital organs like the lungs, I think we might say that we have a reasonable explanation of just why carcinomata of the gullet are difficult to treat by irradiation, and why they fail in so many cases to show anything more than a merely palliative response to the application of radiant energy in whatever form it is administered to them.

Conclusion.

I conclude this article in much the same terms as I began it. Carcinoma of the œsophagus can be palliated and relieved by radiotherapy; discomfort and dysphagia can be diminished, and sometimes even there may be regression and disappearance of the primary growth itself. But, though life may be prolonged a little and made more tolerable by radiotherapy, it is too much to hope for a cure in this disease, except perhaps very rarely, when a case may chance to be seen in its earliest stage. No matter what form of therapy is instituted, surgical or radiational, in this grave malady, the prognosis, as Boyd says, is hopeless. But because, as Hippocrates said (many years before Boyd made his remark): *Sedare dolorem opus divinum est*, radiotherapy (preferably in the form of deep X ray therapy) is indicated as the treatment of choice and should be instituted as soon as possible in all cases of œsophageal carcinoma.

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OBSERVATIONS ON THE COMPARATIVE ANATOMY OF BLOOD.

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THE matter contained in the first section of this paper is largely based on personally recorded notes and drawings from material that in one manner or another has come my way during the course of other investigational and routine work.

A considerable section of the material reviewed was in the form of slides already stained by one or other of the Romanowski techniques (not always precisely indicated), kindly sent to me by Professor

Cleland. Among them are many slides taken by our mutual friend and colleague, the late Dr. Archie Maclean, during the Antarctic Expedition of 1912. Others of the blood preparations were made by me during work on the investigation of staining reactions of granules of fowl leucocytes. To this must be added data from an attempt to investigate methods for an accurate counting, relative and absolute, of avian blood. It is obvious, therefore, that in many instances the conclusions and suggestions presented below are merely the best deducible by me from the material available.

Thus no attempt has been made to check certain obscure aspects of various stained films by other methods, because, in general, duplication of the preparations was not possible. Also for a variety of reasons it was impossible to perform more than an occasional absolute red or white cell count or to use many of the already stained preparations for accurate differential count analysis. Indeed the circumstances of the preparation of the slides sent to me, the result of field work under difficulty, rendered many useful for only one or other study and useless for another.

SECTION I.

AVIAN BLOOD IN RELATION TO MAMMALIAN AND OTHER PRE-MAMMALIAN BLOOD.

For the practical purposes of this paper it is convenient to review briefly the characteristics of avian blood, and this for several reasons. Avian blood, typical examples of which are easily accessible, affords the opportunity of studying those technical difficulties which are associated especially with pre-mammalian blood; in addition it is itself a convenient basic type of all blood possessing nucleated haemocytes.

While differing from mammalian blood in the same broad general way as do other types of pre-mammalian blood and thus being useful in the study of those great contrasts which distinguish all other types of blood from that of mammals, avian blood is also convenient as a base from which to make approach to those special peculiarities that distinguish the blood of phyla and species amongst its near allies, Pisces, Amphibia and Reptilia.

Disregarding the haemoconia, all vertebrate blood is constituted by a functionally homologous trinity of formed elements which are suspended in the plasma: haemocytes, clotting bodies (thigmocytes) and leucocytes.

Comparing avian, as a type of pre-mammalian blood, with the blood of all mammals, including monotremes and marsupials, we are struck by the obvious divergence in morphology, especially of the haemocyte and thigmocyte. These distinctions and the lesser but none the less considerable alteration in nature of cytoplasmic inclusions in otherwise morphologically and apparently functionally homologous leucocytes indicate a very profound difference in blood structure.

The formed elements of avian blood can now be shortly reviewed.

Haemocytes.

Whereas in most mammals the red cell is a biconcave disk and in all cases is non-nucleated in the normal animal's blood stream, in the birds the mature cell is an oval, flattened, nucleated cell. In the circulating blood of birds also, apart from the typical oval cell described, are various precursors in development which differ in haemoglobin content, shape and nuclear structure.

Although it is my experience that nucleated precursors of normal circulating red cells do indeed occur in the blood of certain mammals (marsupials), still it is universally admitted that mammalian nucleated red cells are usually at any rate found only in the blood itself in disease.

Non-nucleated red cells of various shape and containing haemoglobin have been described in bird's blood. Though I have encountered such appearances, I have been unable to convince myself they were not artefacts and, if indeed they exist, non-nucleated red cells must at any rate be regarded as rarities.

The question of the presence of true non-nucleated red cells in any of the pre-Mammalia is one of considerable importance from an evolutionary aspect, and one would hope somewhere along the scale to get evidence of the remarkable transition that has occurred with the coming into being of the monotreme marsupial and mammal. In none of the examples of these orders, including platypus and echidna, various kangaroos, wallabies, native bears *et cetera*, have I ever seen any sign of their supposedly reptilian ancestry expressed in any haematological peculiarity, and, though in certain reptiles I have encountered disk-like non-nucleated haemoglobin-containing bodies, the number of observations made by me is too small to be of much importance.

Thigmocytes.

The avian thigmocyte is a characteristic cell associated with clotting. In stained films these cells may be found most usually in clusters and deformed by the commencement of the clotting process into a variety of shapes, even at times appearing as bare nuclei in portions of the stained film. Where these cells have remained free they may be seen to have a typical oval form, rather smaller and usually also narrower than the mature haemocyte and with special cytoplasmic features later to be more fully described. In untreated dilute blood they are difficult to make out, except as nuclei surrounded by a very poorly refractile cytoplasm. Thigmocytes of essentially similar characteristics are found in fishes, amphibians and reptiles (see Figure I (X) and Figure II).

Leucocytes.

The avian leucocytes comprise many cells almost indistinguishable from those of mammals. The large and small lymphocytes and monocytes are morphologically very similar to those of mammals and share their staining peculiarities and variations.

In birds the granular cells are of three types, two of which closely resemble their mammalian homologues (the eosinophile cells and the baso-

phile cell). There are, however, either none or few neutrophile cells, the place of which is apparently filled functionally by a peculiarly characteristic cell in avian blood, the rod cell.

It will be noted that I purposely differentiate the eosinophile cell, which contains round or slightly oval granules, from the cell I have for convenience called the rod cell. Though this view is apparently not held by certain authors, I further

made. Its nucleus appears to be usually bilobed; but it is often difficult to make out, owing to the characteristic cytoplasmic inclusions, and it seems to stain less darkly than that of the eosinophile cell in the same blood. Generally closely packed in the cytoplasm, and more or less surrounding and hiding the cell nucleus, are the bodies from which the cell is named. These, by suitable staining with eosin-methylene blue sequences or compounds, show

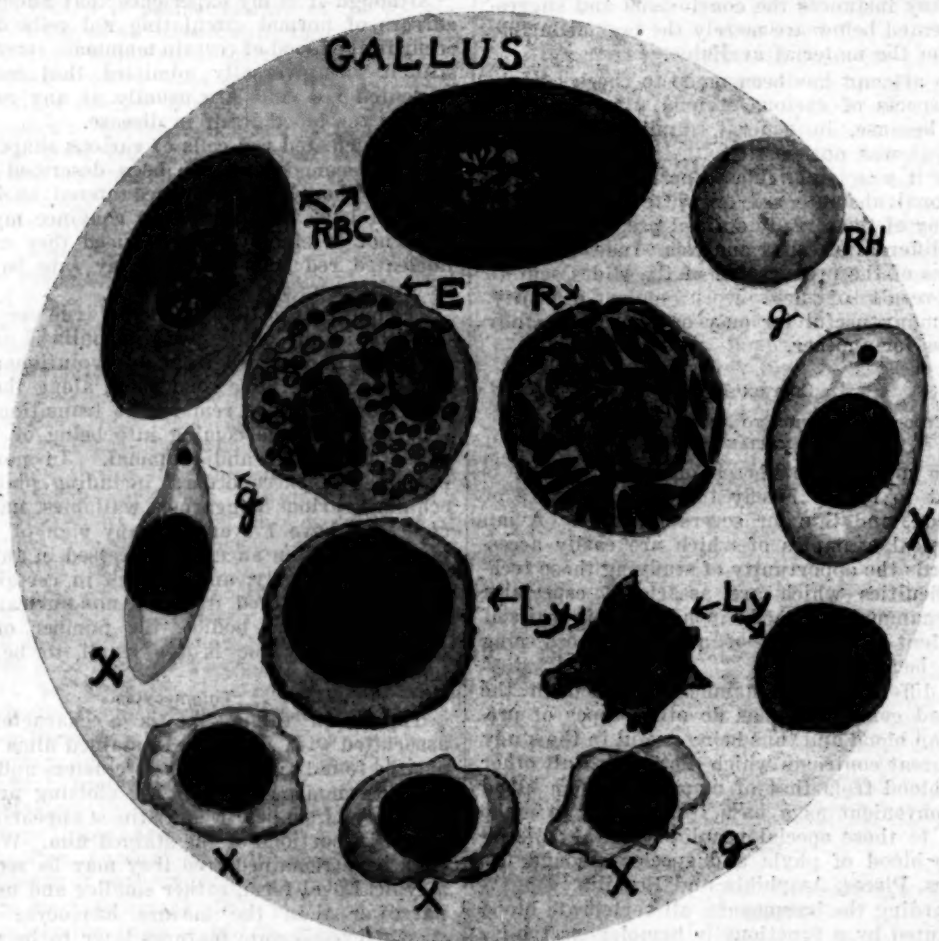


FIGURE I (R.H. = human red blood corpuscle, X = Thigmocyte).

on adduce reasons in support of my contention that the two cells are morphologically and functionally absolutely distinct.

The Avian Rod Cell.

Quite the most conspicuous object in properly stained avian blood films are these rod-containing leucocytes which in films stained by the Romanowski or the eosin-methylene blue method are strikingly beautiful (Figure I, R).

In fowl blood the cell itself ranges from about 10μ to 15μ in diameter, largely depending on the fixation and state of extension when fixed and consequently the thinness of the smear preparation

out as cigar-shaped, cylindrical, pyriform or irregular elongated bodies of a brilliant crimson-lake coloration, but at times, in preparations which are overstained with the basic stain, are duller in colour, no doubt because of some neutrophilic tendency. In size the rod bodies vary chiefly according to their shape. The cylindrical or irregular elongated elements may be as much as 3.5μ or more in length, and are usually 0.5μ at their widest point in cross section. The more common cigar-shaped bodies are in the fowl found to vary between 2.0μ and 2.5μ in length and may be 1.0μ at their widest.

In fully stained preparations there is often seen in the cigar-shaped or in the pyriform bodies the appearance of a clearer mesial zone, itself oval in shape, which gives the suggestion of a vacuole or hollow portion.

When the colour of the rod bodies has been partially removed, as described later, by water or weak acid solutions, demonstration is made of darker or lighter parts, giving the impression of deeply stained granules along the paler length of the body. These granules seem also to correspond to the irregularities of contour often appreciated in the fully stained rods. The picture presented in such partially decolorized preparations recalls the unequal staining of such bacilli as that of diphtheria or of certain phases of the bacilli of leprosy or tuberculosis.

These findings seem to discount the suggestion that the rod body is a crystalline structure, and on the other hand make it seem probable that it has a complex constitution, with portions differing chemically and physically.

Though the above observations have chiefly been based on data from various films stained with eosin and methylene blue or Romanowski stain, I have been able to stain the rod bodies with strong alcoholic hæmatoxylin, and with this essentially basic stain I have been able also to demonstrate the inequalities of colour and shape referred to above. The possibility of staining the rod bodies by both acid and basic stains makes out a rather suggestive case for the possession by the rod bodies of a partially neutrophilic reaction.

My observations show that the rod bodies are stained only by an alcoholic solution, and the staining of them is interfered with by physical processes associated with drying of the alcohol-fixed film and also by the exposure of this fixed film to watery solutions or water before the alcoholic stain is applied. In these respects their constitution appears to differ fundamentally from the true eosinophile granules either of birds or of mammals.

On the other hand, and provided the slide is not subjected to drying which would destroy the rods or prevent their demonstration, it is possible to pass the unstained preparation, after fixation in alcohol, through ether, chloroform, benzol or xylol without affecting the staining either of rod bodies or eosinophile granules. The rod bodies, once stained, part with their stain only after prolonged

washing in water or by shorter sojourn in weak acids. The rod bodies and eosinophile granules, once stained by an alcoholic solution, do not readily lose this stain by moderate washing in alcohol. Comparatively, the eosinophile granules are less affected by washing in water or weak acid than the rod bodies.

These facts undoubtedly seem to indicate that the rod bodies in avian blood are biologically distinct from the eosinophile granules and that therefore the rod cell should not be considered merely as a modification of the eosinophile cell.

Phylogenetically my observations, though small, indicate that the class of cells containing rod-shaped pink-staining inclusions is an ancient one. These cells are found with typically formed rod bodies in fishes. Less characteristically uniform in their shape, similar inclusions are found in reptiles. In this phylum my examples show quite similar rods to those of birds in some members and less regular ovoid or pyriform bodies, possibly mixed with short oval or round granules, in the cells of other species.

In the frog and the newt, which are the only examples of amphibians in my series of slides, I have not been able to satisfy myself that typical rod bodies exist, but I have found doubtful cells with what are probably basophilic rod-like inclusions. Rod cells are not found, at any rate not typically, where definite neutrophile cells are present; but eosinophile cells may exist side by side with rod cells or neutrophile cells.

Regarding the physiological homologues of the rod cells, much remains to be done; but the few tests I have made agree with the suggestions of other workers that they replace functionally the neutrophile cell.

The following short protocol explains the basis on which such an hypothesis rests.

Experiment II. (effect of the subcutaneous injection of surrogate turpentine on the leucocyte response of fowls): Differential counts of a white leghorn cockerel's blood were made, and immediately afterwards turpentine was injected into the axilla. I did not discover till later that the substance used was not true turpentine, which is known to cause a polymorphonuclear-neutrophile response in mammals. However, the results indicate that the effect of the surrogate turpentine was similar. In any case the effect was specific for the rod cells, leading to a pronounced relative increase in these cells, which slowly returned to close to the original figure (see Table I). There was no external evidence of abscess.

TABLE I.
The Results of the Injection of Surrogate Turpentine to Fowls.

Date of Injection.	Number of Cells Reviewed.	Rod Cells.	Mononuclear Cells Per centum.	Eosinophile Cells Per centum.	Basophile Cells Per centum.
March 1, 1932	2,000	12.15	81.95	2.15	3.75
March 3, 1932	2,000	36.5	62.0	0.5	1.0
March 4, 1932	800	27.0	67.0	3.0	3.0
March 5, 1932	400	16.75	77.25	2.0	4.0
March 6, 1932	500	14.0	81.0	2.0	4.0
March 9, 1932	1,000	13.0	84.0	0.7	1.6
March 10, 1932	500	16.0	77.0	3.4	3.6

NOTE.—The rapid increase and gradual subsequent decline of relative numbers of rod cells. Probably many deformed thymocytes are included among the number of mononuclear cells.

Non-Granular Cells.

Non-granular cells predominate in bird's blood; but this predominance is not necessarily of any phyletic distinctive value, as certain mammals share the peculiarity, as indeed do the young of all mammals observed.

Numbers of Various Leucocytes in Birds.

My material has not been suitable for the consideration of the matter of absolute cell counts, and most of the material was not very useful for accurate differential counts. In the present descriptive outline, however, I may say that my figures indicate that about 70% of the leucocytes in fowls are of the mononuclear type. About 15% to 20% are rod cells, and the balance is comprised of basophile cells and eosinophile cells in rather variable numbers. I have made counts showing as low as 4% of rod cells and as high as 44%.

Generally the basophile cells range from 1% to 4%. True eosinophile cells have been found by me to be numerically very variable in fowls.

In a big series of examinations made at Goulburn the eosinophile cells and rod cells were about equal in numbers, approximately 13% of each type. Examinations made in Sydney show a decidedly lower eosinophile cell figure. This may be correlated with parasite infestation.

Leucocytes in other Pre-Mammalian Types.

As regards the relationship of various leucocytes in birds to those of fishes, reptiles or amphibians, my material, while admittedly it is not of very wide extent, has tended to confirm Lowenthal's findings.

Definite and well-formed rod cells have been found in many fishes, reptiles and birds, but not so far definitely in amphibians. So far I have felt convinced of the presence of true neutrophile cells only in amphibians; but certain cells in *Ceratodus* are possibly of this order. In this respect my material does not enable me to agree with certain authors who consider that cells of this order can be found in fishes and birds.

Eosinophile cells, and here I recall that I do not regard the rod cell as an eosinophile cell, have been found in birds, amphibians and mammals, but not so far in my fish material, except *Ceratodus*.

It will be seen from the above that though rod cells and true eosinophile cells exist side by side in avian blood, and neutrophile cells occur in both mammals and amphibians, there is no instance of the occurrence of both neutrophile and rod cells together, unless *Ceratodus* be an exception. Basophile cells are found throughout the series, with

apparently wide specific variation; but there is no evidence of their relationship to any phyletic specialization.

In Table II are summarized the relationships of leucocytes in members of various vertebrate phyla examined by me.

SECTION II.

STAINING AND OTHER TECHNICAL CONSIDERATIONS IN RELATION TO AVIAN AND ALLIED BLOOD.

As a result of numerous observations on preparations sent to me from various sources, I was early impressed with the difficulties surrounding the cytological study of pre-mammalian blood in comparison with similar investigations in mammals.

Although my own work embraced only the study of Romanowski and related methods of staining, it soon became apparent that even with this restricted field there was much to learn by one who, like myself, had hitherto mostly been concerned with mammalian blood, and more especially human blood. As is well known in routine hospital work, there are quite a number of modifications of staining with eosin and methylene blue, either separately or in combination, that give excellent results in the examination of human blood smears. In fact it is possibly largely due to this essential flexibility that one or other eosin-methylene blue or Romanowski process (modified frequently to the whim of the individual worker) is always the process selected for pathological investigations.

Provided the film undergoes proper fixation (which may be done separately or during the process of staining) it does not make a material difference to the general demonstration of essential cytological details whether the staining is carried out with alcoholic or watery stains or both.

Usually such a mixed stain as Jenner, Leishman or Giemsa is used first in strong solution, then diluted. Giemsa alone requires, but the others permit, preliminary fixation with methyl alcohol. I have never noticed any perceptible difference, at any rate in leucocyte detail, whether the preparation was fixed immediately or some hours later, or whether the methyl alcohol was allowed to dry slowly or absorbed by blotting paper. Though undoubted differences in density and detail may be obtained by various modifications of time in staining, length of time in strong or dilute stain, and time of washing, and the use of distilled or rain or tap water, the general demonstration of the various types of cells is remarkably similar, and a useful practical result can be obtained in many ways.

TABLE II.
The Occurrence of Various Leucocytes in Animals of Various Phyla.

Phylum.	Mononuclear Cells.	Neutrophile Cells.	Rod Cells.	Eosinophile Cells.	Basophile Cells.	Thigmocytes.
Fishes	+	— (?)	+	— (?)	+	+
Amphibia	+	+	— (?)	— (?)	+	+
Reptilia	+	— (?)	+	— (?)	+	+
Aves	+	—	+	+	+	+
Mammalia	+	+	—	+	+	—

Watery dilute solutions of any of the usual stains work very effectively once fixation is complete, and all types of leucocyte granulation are reasonably well brought out. For example, the following sequences, selected from many, all give good though varying pictures; all particularly demonstrate the granular cells satisfactorily.

- (a) Leishman in methyl alcohol.—Blot.
- (b) Leishman in methyl alcohol.—Wash with water, blot.
- (c) Leishman in methyl alcohol.—Dilute with water and continue staining for some minutes; wash with water, then blot.
- (d) Methyl alcohol (separate fixation) followed by dilute Leishman.—Wash and blot.
- (e) Methyl alcohol (separate fixation) followed by dilute Giemsa.—Wash and blot.

There is some variation in the intensity of the neutrophile granules, indeed of all granules, with each variation of method; but each of the methods mentioned above is capable of showing up clearly the eosinophile and basophile granules particularly.

Quite different, however, is the staining by similar methods of bird's blood, and, by analogy (and by such experience as I have gathered), of other pre-mammalian blood.

Confining myself for the time to avian blood, on which experiments following restaining reactions were made, two most notable distinctions are discovered, according to the method of fixation and staining and other treatment of the preparation: (a) certain characteristic white cell inclusions (rod bodies) fail to stain with other than alcoholic solutions; (b) certain physical conditions (mode of drying, action of water *et cetera* after fixing but before staining) interfere with staining even by appropriate alcoholic solutions.

The tabular statement below, which is taken from the protocols of a number of my own experiments, shows the principal relationships between the staining reactions of avian and human blood.

Much of the work was done with slide preparations one longitudinal half of which was spread with mammalian (human or guinea-pig) blood, the other with that of fowls, the staining processes being carried out simultaneously. This table also illustrates the broader question of certain activities of the two primary dyes used, eosin and methylene blue, and reminds one of what was originally stressed by Ehrlich and should not be forgotten, that in mixtures of the two dyes there are produced several, possibly many, new chemical combinations which are active agents in the production of the final picture; this picture may therefore differ fundamentally from one produced by the quite separate action of the two original dyes.

Experiment I. (Note: M.A. = pure methyl alcohol; E.M.A. = solution of eosin in methyl alcohol; E.W. = watery eosin solution; W.M.B. = watery solution of methylene blue.) The actual strengths of the solutions and the time of their application may be considerably varied to suit special needs and are not pertinent generally to this particular series of tests.

1. E.M.A.: (a) The red cells stain pink, all nuclei are slightly indicated. Both human and avian true eosinophile granules and rod bodies of avian blood are well stained. The neutrophile cells are poorly stained. (b) Similar

results are obtained after separate fixation with M.A. (immediately before E.M.A.) and without drying. (c) Moderate washing with distilled rain or tap water does not remove the stain from any structures affected by E.M.A.; but long washing or soaking in water removes the stain, partly or completely, from the rod cells and much less readily from eosinophile cells, whether human or avian. (d) A solution of 0.2% acetic acid or much weaker nitric acid applied after E.M.A. removes the stain more or less completely from the avian rods, but is less effective in decolorizing either human or avian eosinophile granules. (e) If comparison be made on the same slide the human or guinea-pig eosinophile granules are deeper stained than those of the fowl.

2. M.A. followed by Dilute Watery Stains: (a) After fixation of the film in methyl alcohol watery eosin stains both human and avian eosinophile granules well, but fails to stain the avian rods. (b) Similarly, after M.A. fixation watery dilute Leishman or Giemsa *et cetera* fails to stain rods but demonstrates eosinophile granules, and, of course, brings out nuclei and basophile and neutrophile granules.

3. Separate E.M.A. and W.M.B. or M.A. followed by E.M.A. and W.M.B.: Eosin in methyl alcohol followed by rinsing in water and immediately, without drying, by a watery solution of methylene blue (whether or not there has been prior separate but not dried M.A. fixation) will give a good demonstration of all granules in mammalian or fowl's blood except the basophile granules. The inclusion bodies, later on described as the rubin bodies, of fowl thymocytes are not well shown. Probably the basophile granules do stain with the methylene blue; but this is removed in the final rinsing.

4. Drying *et cetera*: If films are fixed in M.A. and allowed to dry, especially if the drying is forced by slight heat, but even if they are blotted dry before staining with E.M.A. or Leishman, the staining of the rods is impaired to a greater or less degree; but, on the other hand, both human and avian eosinophile granules are unaffected.

5. The Use of Ether *et cetera* after Fixation: Films fixed with M.A., but not allowed to dry before alcoholic staining, may be rinsed for at least several minutes in ether, xylol, benzol or chloroform, which substances are washed off with M.A. If then they are treated with E.M.A. or Leishman (alcoholic) stain, no particular interference with satisfactory staining is observed. Good pictures of both rods and eosinophile granules are obtained.

6. Water: A similar sequence to 5, but with the substitution of either water or 0.9% saline solution for the ether *et cetera*, will completely fail to stain rods, but will stain eosinophile granules well.

7. Basophile Cells: To demonstrate basophile cells satisfactorily and bring out their characteristic granulation a previously mixed preparation of eosin and methylene blue must be used. The colour of the stained basophile granules after such treatment shows that they are stained by some product of interaction of the original dyes, as they are a peculiar purple not seen in separate eosin and methylene blue preparations.

Conclusions from the above may be shortly put thus:

Avian (fowl) blood is best stained by a method which applies the eosin or related acid stain in alcoholic solution and when the use of water or saline solution forms no part of the process until after the alcoholic stain has acted.

Adequate fixation before treating with water or watery stain is no preventive for the destructive action of the latter on the rods. Water applied in moderation after staining is not detrimental to the result, and when left in contact with the stained preparation for a longer time is the means of showing up details of structure of the rod bodies not otherwise appreciated.

It will be noted that I have not discussed the precise effect of the different procedures on the neutrophile granulation. For a variety of reasons this question is a complex one, and though I have indeed noticed certain effects I prefer at present to leave this aspect out of the discussion.

In the fowl, which I have most closely studied, the thigmocyte is in its resting condition an oval cell with a regular contour, about 9μ long by 4μ to 5μ broad, and with an oval or round, rather condensed nucleus with irregular darker chromatin masses throughout its structure. The cytoplasm of the

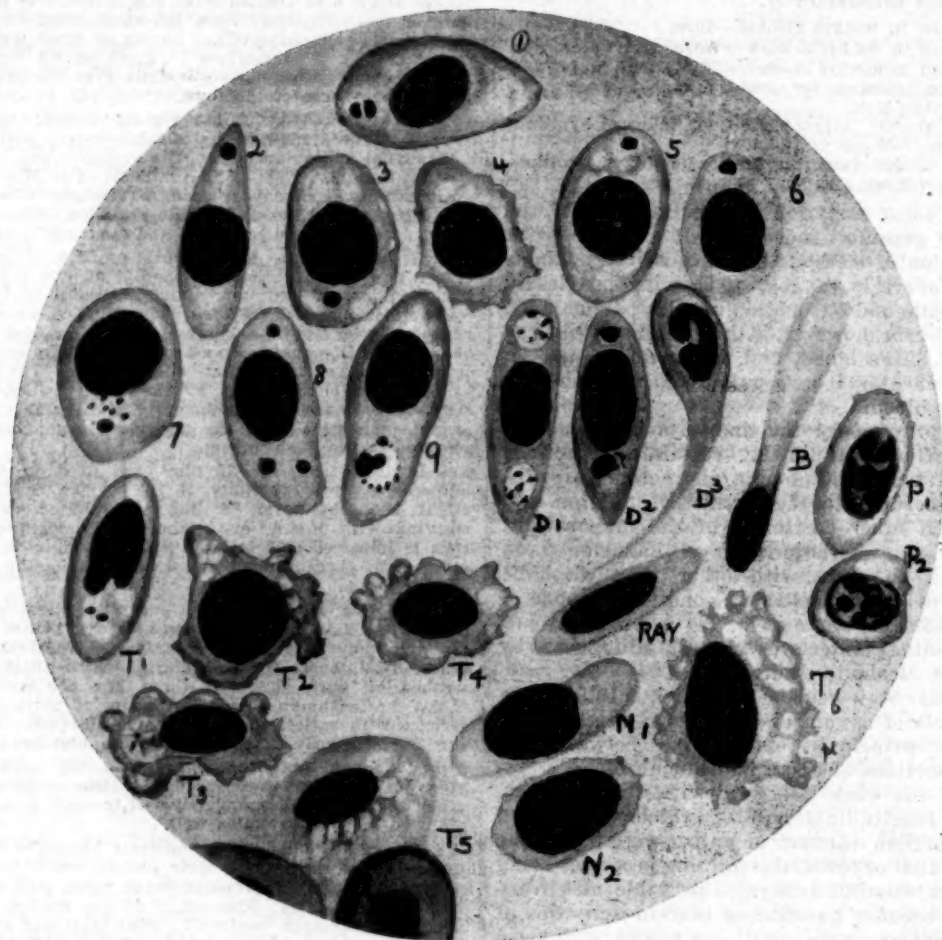


FIGURE II.

SECTION III.

NOTES ON THIGMOCYTES IN BIRDS AND OTHER ANIMALS.

Thigmocytes in Birds.

It is impossible to divorce consideration of the thigmocyte from that of the nucleated red cell of bird's blood and related blood containing nucleated red cells, principally because of the undoubted morphological resemblance and possible genetic relation between the two classes of cells.

Although it is widely admitted that the clotting cells of birds are oval nucleated bodies, quite recent text-books reflect the uncertainty as to their exact nature and relationships, especially as to their position in regard to various stages in haemocyte development.

thigmocyte is pale, and in unstained wet preparations is difficult to make out owing to its poor refractibility. It is usually neutrophilic in reaction, but may be slightly basophilic. It usually contrasts as pale against the generally more deeply stained cytoplasm of the lymphocytes. Vacuolation of the cytoplasm and the presence of cell inclusions are the most distinctive property of the cytoplasm. Unfortunately for differentiation the appearance of vacuolation is seen in red cells under certain conditions, though rarely. Vacuolation occurs also at times in certain leucocytes, but is not likely to cause confusion because of the characteristic oval shape of the thigmocyte in its resting stage. The inclusions now to be discussed have not, so far as

I can find out, been hitherto described. They are not always demonstrable and apparently are not always present; for I have found preparations in which some thigmocytes have the inclusions and others are apparently free from them.

The characteristic appearance of these inclusions, which I have for convenience called "rubin bodies", is that of a purplish-pink granule at or near one pole of the cell and usually associated with a vacuole or vacuoles.

In the simplest form the inclusion is a coccal body of precise contour, round or oval in shape, and with a diameter of 1μ or somewhat more. Around this granule is either a lighter stained area of the cytoplasm or a definite vacuole (Figure II, 2, 3, 5, 6, and Figure I, Xg).

Another cell may have precisely similar appearances, except that the granule is divided into two by a straight line, giving exactly the appearance of a pair of gonococci with flattened opposed sides (Figure II, 1). Irregular elongated or oval forms and unequally divided pairs are also seen. Still more characteristic appearances are at times seen when a signet ring structure is made up by one or two larger granules on the periphery of a vacuole around which are other less definitely shaped smaller granules (Figure II, 7).

Sometimes rubin bodies may be found at both poles of the cell or in other parts of the cytoplasm (Figure II, 8). The demonstration of the rubin bodies seems best effected by one or other compound stain, such as Leishman, probably because the colouring is produced from a derivative-stain rather than from either the eosin or methylene blue acting separately. Darker stained films also seem best to show up the structures.

In view of the undoubted absence of these appearances from some cells and their presence in others in the same film, in addition to the failure to find them in certain preparations, the question is raised whether they may represent either artefacts or degeneration processes. Also it is permissible to suggest that the formation of the rubin bodies and the vacuolation represent stages in the functional activities of the thigmocyte in relation to its share in the clotting process. So far I have not been able to determine whether they are or are not more frequent in the resting cell or those already distorted and altered in the clot formation.

The above-mentioned "resting stage" is merely my provisional name for a thigmocyte that has an unaltered oval shape and is not associated with other thigmocytes or other cells in the agglutination which is so characteristic an appearance of bird's blood as it commences to clot. In the process of coagulation the thigmocyte may present all sorts of shapes, from variously deformed oval to small, round, often almost cytoplasm-free units and irregular, flattened, highly irregular bodies whose contours blend with the neighbouring red cells or leucocytes. Masses of a hundred or more may be at times demonstrated when the individual outline is completely or incompletely lost; but frequently

in such masses the rubin bodies stand out with surprising clarity.

The differentiation of the thigmocyte from stages in the life history of the red cell is in fowls usually easy; but in other animals it is less so. The differential points are the smaller size of the oval of the resting thigmocyte and the absence of hæmoglobin.

In view of the undoubtedly oval shape of the thigmocyte in its "resting stage" it is permissible to visualize a probable and fairly recent divergence of the red cell and the thigmocyte from a common precursor. Some of the appearances seen by me, chiefly in reptilian blood, suggest that the primitive hæmatoblast, a round, non-hæmoglobin-containing cell, may give rise to both thigmocyte and red cell. This too would explain the occasional doubtful forms. This suggestion, if borne out by further work, would harmonize with certain suggestions that the clotting cells in mammals also are related to the hæmocyte series.

The Thigmocyte in Animals other than Birds.

Excluding the blood platelets of mammals, the nucleate oval thigmocyte is characteristic of all species I have examined, and though not always demonstrated satisfactorily in my particular collection of blood films for reasons heretofore indicated, could doubtless be proven an essentially similar structure in fishes, amphibians, reptiles and birds.

Figure II includes drawings of these cells in the death adder, bull-rout, ray, tortoise, newt and penguin. Note the demonstration of vacuolation and rubin bodies and the gradual loss of contour during their physiological processes in several phyla. The bizarre tadpole-like appearance of the cell in the bull-rout's blood, in view of the fact that in this fish many of the thigmocytes show up as bare nuclei, may possibly be explained by the commencing degeneration of the cytoplasm associated with clotting and be functionally similar to the appearances seen in bird's blood, and marked 4 in the figure.

It might be further noted that in tortoise blood the typical colour (reddish-purple) of the rubin body was not demonstrated in the inclusions shown in the figure, being bluish-grey. A final observation frequently noted by me is the similarity of the frilled and vacuolated edges of the functioning thigmocyte to the mammalian platelet.

EXPERIMENTAL MATERIAL USED IN THIS PAPER.

The material on which the above paper was based includes samples of blood from the following:

Aves.—Fowl, hooded robin, Blue Mountain parrot, emu, honeyeater, emperor penguin, other penguins, chick penguin, Grant petrel, Wilson petrel, Antarctic petrel, snow petrel, skua gull.

Pisces.—*Oeratosus forsteri*, cod (various), bull-nose ray.

Reptilia.—Skink, gecko, diamond snake, death adder, tortoise.

Marsupialia.—Koala, dasyurus.

Monotremes.—Ornithorhynchus.

Mammals.—Man, sea lion, bat, dog, cat, kitten, guinea-pig, rabbit.

**BLOOD PRESSURE IN THE AUSTRALIAN
ABORIGINAL, WITH A CONSIDERATION
OF POSSIBLE ETIOLOGICAL FACTORS
IN HYPERTENSION AND ITS RELATION
TO CIVILIZATION.**

By L. J. JARVIS NYE, M.B., Ch.M.,
Brisbane.

In considering the problems associated with raised blood pressure it is important to ascertain whether such a condition is a normal state in senescence. That such a belief is widely held in the profession is implied by the frequent reliance placed on such a standard of normality as 100 *plus* the age of the patient (in millimetres of mercury).

In an attempt to elucidate this question the study of Australian aborigines promised a fertile field, for they stand at the bottom of the evolutionary ladder of anthropological relationships, and they are considered to be the prototype of man as he appeared in the Stone Age in Europe. They also can still be found living in a state of environmental simplicity.

With this object in view the writer made a visit to the Lockhart River Aboriginal Mission on the Cape York Peninsula. To this mission, under the auspices of the Church of England, is entrusted the care of four distinct tribes of aborigines. Amongst them the older members have spent most of their lives in their primitive native state.

All available old men and old women were examined, and although it was impossible to obtain accurately their ages, a reasonable estimate was made by a knowledge of their progeny. Most were either grandparents, great-grandparents or great-great-grandparents. In all, 103 aborigines were examined, of whom 63 were males and 40 females. In a general way the constant finding of a low tension pulse and of arteries of normal appearance was very striking.

The following table shows the average systolic and diastolic pressure in computed age and sex groups.

	Age in Years.	Number Examined.	Average Pressure in Millimetres of Mercury.
Males	40 to 49	12	131/80
Females	40 to 49	10	125/77
Males	50 to 59	23	133/78
Females	50 to 59	11	133/79
Males	60 to 69	21	133/74
Females	60 to 69	14	129/78
Males	70 and over	7	140/76
Females	70 and over	5	135/74

The highest systolic pressure recorded was 188 millimetres of mercury and the highest diastolic

pressure 90 millimetres, in a male aged about fifty-five years.

Due allowance must be made for the effects of emotion, for many were nervous and afraid of the ordeal to which they were bribed to submit themselves; the readings also were taken with the subjects in the sitting posture. In confirmation of these findings, the superintendent of the mission, Mr. H. Rowan, who has lived among the natives for thirteen years, informed me that amongst them he has only known one instance of sudden death and only one case of paralysis in an old man.

In a personal communication Sir Stanton Hicks has noted a similar finding in tribes of aborigines in central Australia.

These observations show that raised blood pressure and vascular sclerosis were entirely absent in this group of aged primitive aborigines, and therefore suggest that hypertension is not a normal condition of senescence.

Other observations of these simple people give one reasonable grounds for criticism of certain theories which have been postulated regarding the aetiology of morbid vascular states. For many years focal sepsis has been considered a responsible factor; nevertheless, amongst these old natives, many had foul breath with gross oral sepsis and palpable cervical glands.

Tobacco has also been considered to play a causative part. Yet for many years past, trade tobacco, which is too strong for most white men to smoke, has been almost as important to these natives as food. They smoke and chew at every possible opportunity, and when the supply of tobacco runs out they often grind up their pipes and smoke the nicotine-impregnated wood.

Many of us too have had a deep-rooted belief in the dangers of a high-protein diet. Mr. Rowan informs me that, contrary to the habits of the natives in other parts of Australia, these tribes in the native state have been almost entirely carnivorous.

The mode of living of these natives is very different from those of civilized communities, and it is interesting to speculate further as to the part played by these essential differences. In this connexion it is important to bear in mind the possibility of two distinct origins for the vascular abnormalities, the first being the presence of abnormal amounts of toxic bodies in the circulation, and the second being some neurogenic disorder in the blood vascular system.

The following four factors suggested themselves to the writer as having possible significance:

1. Although the natives are essentially carnivorous in their diet, they differ greatly from civilized communities in their eating habits. When they are fortunate in the hunt and have abundance of food, such as wallabies, birds, fish *et cetera*, they gorge themselves, but it may be several days before they have another good meal. As they are very improvident and rarely hunt unless they are hungry, they must often exist for long periods with little or no food. It is probable that during these periods of fasting the end-products of protein metabolism are very completely eliminated.

2. The absence of clothing prevents any interference with the normal heat-regulating mechanism of the body.

3. The absence of lead in their environment may be important. Those of us who are familiar with the question of lead poisoning amongst children in Queensland, know that most cases of chronic plumbism in childhood terminate in a slowly progressive arteriosclerosis and chronic nephritis in early adult life. We know also that there is a considerable amount of lead in the atmosphere of cities, as has been demonstrated by the finding of abnormal quantities of lead in the urine of city dwellers with no known contact with lead.

4. These people live in a state of communism, in which food and possessions, joys and sorrows are shared by the whole tribe. There is none of our civilization's selfishness, which causes so much of the stress and strain, both mental and physical, in our lives. They have, nevertheless, remarkable powers of endurance; for instance, we had as a guide on one of our trips an old gin who was a great-grandmother and yet set a pace that kept us hard pressed to keep up with her.

While this brief communication does not pretend to add much to our knowledge of hyperpiesia, it does raise some important considerations. It suggests that we must discard our long-held belief in the age factor *per se* in the production of this condition. It also suggests that arteriosclerosis and hyperpiesia may be the price our civilization pays for modern amenities in satiated appetites, in sartorial perfection, and in a vitiated atmosphere, and for our successes in a life of stress and strain. Whether the price is too high is a question for the sociologist. As practising physicians our interest must be as to whether we can learn some lesson in prevention from the simple life story of the aboriginal.

Acknowledgements.

I wish to acknowledge my great indebtedness to the Superintendent of the Lockhart River Mission and his wife (Mr. and Mrs. H. Rowan) for their hospitality, for their help, for facilities in the examination of the natives and for information regarding their habits and their mode of life.

Reports of Cases.

ESOPHAGEAL ACHALASIA TREATED BY SYMPATHECTOMY.¹

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Western Australia.

A male patient, thirty-nine years of age, was referred to me by Dr. Cuthbert in December, 1935. He gave a history of difficulty in swallowing, with choking attacks during meals, first noticed in June, 1928; this was succeeded by regurgitant vomiting. By July, 1933, he could with great difficulty swallow fluids, and his vomitus was often foul-smelling. His weight had dropped from twelve stone ten pounds to nine stone three pounds, and he became

too weak to work. He then underwent operation for acute appendicitis and recovered remarkably well. He first presented himself in Dr. Cuthbert's clinic at the Fremantle Hospital in February, 1935. Bougie and wash-out treatment was followed by a temporary improvement. When referred to me, he could not eat solid food, and fluids were swallowed only after repeated attempts, often being vomited immediately. His weight was nine stone five pounds. Skiagrams revealed a typical wide cylindrical dilatation of the oesophagus, which at the level of the diaphragm tapered off into a narrow conical apex. A barium meal was given, and screen examination showed no barium entering the stomach.

Operation was performed on December 18, 1935, according to the method advocated by W. A. D. Adamson in *The Proceedings of the Royal Society of Medicine* of January 1, 1935, and H. S. Souter in *The British Medical Journal* of October 26, 1935. Portion of the left gastric (coronary) artery was excised, between its origin in the coeliac axis and a point high up on the lesser curvature of the stomach. With this section of the artery were removed its accompanying vein and parts of two small arterial branches leading upwards towards the oesophagus. At the same time an attempt was made to remove with the vessels some of their surrounding tissues between the leaves of the gastro-pancreatic fold of the peritoneum. On the following day the patient claimed that he could swallow fluids well, and that he could "hear his drinks splashing into his stomach". Three weeks later, when discharged from hospital, he was able to eat solid foods freely, swallowing slowly but apparently without effort. At the present time, ten months after operation, his weight is eleven stone eight pounds. He has not vomited since operation. He eats ordinary food, but thinks that he takes more time over his meals than the average person. He is engaged in constant labouring work. X ray examination shows no diminution in the calibre of the dilated oesophagus, but barium "swallows" enter the stomach freely.

Reviews.

BOVINE TUBERCULOSIS IN MAN.

THE human subject is susceptible to attack from two types of tubercle bacilli, the human and the bovine. It is commonly accepted among medical men that pulmonary tuberculosis is due to the human type of bacillus, whilst glandular, bone and joint tuberculosis arises from infection by the bovine type of organism. In a general way this is so. Investigations made in England on behalf of the committee appointed by the Economic Advisory Council to investigate cattle diseases showed that in a large series of patients studied the bovine type of infection caused only 1% of tuberculosis affecting the respiratory system. Tuberculosis of other organs was due to the bovine type in varying degree: the central nervous system 25%, the intestines and the peritoneum 82%, the vertebral column 25%, other bones and joints 15%, skin and subcutaneous tissue 44%, lymphatic system 46%, and genito-urinary system 77%. Bovine tuberculosis in man is due in practically every case to infection via the alimentary tract, and milk is in most cases the infecting agent. The committee found that more than five cows in a thousand in England yielded milk infected by tuberculosis.

Dr. Nathan Raw has been interested in this subject for many years and has aimed to produce a suitable vaccine.¹ He has cultivated the human, bovine and avian types of tubercle bacilli over a period of thirty years. He states that subcultures have been made every month,

¹The patient described herein was shown at a meeting of the Western Australian Branch of the British Medical Association on October 22, 1936.

¹"The Control of Bovine Tuberculosis in Man", by N. Raw, C.M.G., M.D., M.R.C.P.; 1937. London: Baillière, Tindall and Cox. Crown 8vo, pp. 135, with illustrations. Price: 6s. net.

and the growths that he is working with at present represent the three hundred and sixtieth generation. Attenuation of virulence, he states, has been attained in this way. He further states that, although the attenuated organisms are non-pathogenic to all animals, they still retain very important immunizing properties, and that they are "suitable for immunization of calves and also for treatment of suitable cases of tuberculosis". The tuberculin so produced is, he states, suitable for use in human subjects. He affirms that there is antagonism between the human and bovine types and that when the infection is due to the human type of bacillus bovine tuberculin is to be used in treatment.

Dr. Raw holds the belief that transmutation of types may occur and that bovine tubercle bacilli introduced into the human body in childhood may, after many years' growth, undergo mutation and become human bacilli. He states that he has had no opportunity of proving this theory. He might have further stated that proof of such a theory is impossible.

The bulk of the little book deals with the dangers of infected milk and the value of pasteurization in rendering milk safe. Efficiently performed pasteurization, Dr. Raw considers, is a safe and certain remedy against the infection of babies and children by bovine tuberculosis, whilst the nutritive qualities of the milk are in no way changed. There is a good deal of unnecessary repetition in the book, and the amount of space devoted to the original work is barely a dozen pages. It is probable that Dr. Raw's purpose would have been as well served by the publication of suitable articles in current medical journals. The book does, however, possess a value in directing attention to the danger of the tuberculous cow. The milk of one cow, when mixed in a large supply, may infect the whole. At the United Dairies, London, where the milk arrives from the country in three-thousand-gallon tanks, it was stated in 1934 that tubercle bacilli were found in every sample of untreated milk tested. For practical purposes pasteurization of all milk for children is the only efficient safeguard. If Dr. Raw's monograph leads to an extension of this beneficent practice it will have more than justified its appearance.

ALLERGY.

"CLINICAL ALLERGY, MANIFESTATIONS, DIAGNOSIS AND TREATMENT", by Albert H. Rowe, is devoted to the simplification of the present knowledge of allergic conditions.¹

Allergy is a mechanism established in the tissues of the animal as a protective response from repeated exposure to a foreign substance, especially in large amounts. It develops after months or years of exposure to or ingestion of the allergen. Experiment has shown that practically all proteins are allergenic, but specific carbohydrates of allergenic activity have also been demonstrated.

Evidence points to the reticulo-endothelial system as the centre for the production of allergic antibodies.

Throughout the whole book the common occurrence of food allergy is stressed. Most people, at some time of life, especially in childhood, suffer in varying degrees from allergy to foods. Many of these allergies persist throughout life and give rise to unrecognized slight or marked manifestations, the true explanation of which may elude the trained allergist. Allergy next to infection is probably the most common and important single aetiological cause of human symptomatology.

Failure to control food allergy has arisen from too brief periods of exclusion of foods. Cellular effects of food allergy often persist for weeks or months after exclusion of foods.

Allergic reactions from foods may be immediate or may be delayed for a few minutes to several days after

ingestion. Fatal reactions due to food allergy may occur in infants.

Some atmospheric condition near the coast makes patients susceptible to allergens, especially to foods.

Physicians who depend on the skin reaction, and especially the intradermal test, for the determination of allergic foods, are prone to suspect many foods unnecessarily because of the frequency of non-specific reactions. The clinical effect is the final criterion, and diet manipulation should always be employed.

The leucopenic index is of definite value in estimating the allergenic foods.

Elimination diets are given for trial in suspected cases of allergy and for those sensitive to foods. Wheat, milk and eggs are common causes of allergic reactions. The exclusion of a food from the diet will usually bring about desensitization or hyposensitization to that food.

Possible gradual or sudden disappearance of tolerance for a specific food must be recognized. Hypodermic desensitization to foods is disappointing. Eating of preliminary small meals or the denaturation of the foods leads to good results.

Allergens, both mineral and organic, in drinking water must be suspected in certain instances. Gastro-intestinal allergy is discussed at length, and food allergy is stated to be a common cause of canker sore, stomatitis, pain in the upper right abdominal quadrant, colitis, proctitis, pruritus ani, allergic toxæmia—fatigue, mental and menstrual disturbances.

If food gives no allergic reactions, in the absence of other pathological change, the use of elimination diets for diet trial is indicated for diagnosis. Food allergy cannot be excluded without diet trial.

Asthma is discussed; pollen and other inhalants, and food are mentioned as causes of asthma.

Bacterial allergy and surgery on the nose and throat have received attention, and it is generally conceded that no surgical operation should be performed on the nose, sinuses or tonsils of patients with naso-bronchial allergy until careful allergic investigation and treatment have been carried out.

A pessimistic attitude regarding possible benefit from tonsillectomy in bronchial asthma is general. Rowe considers that vaccine therapy is indicated in all asthmatics who have a purulent bronchitis.

Allergic dermatitis is dealt with very fully, the chief cause being foods. Sensitization may arise through the placenta from egg in the mother's diet. Egg is hard to digest and enters the blood more easily than any other protein. Inhalants may produce dermatitis; but negative results to skin testing may be found both with inhalants and ingestants, and must be checked with clinical trial. Rowe points out that food allergy may produce allergic eczema throughout life, but that inhalant allergens may cause dermatitis with increasing frequency during youth and in adult life. Desensitization with causative pollens gives the best results in dermatitis in those patients sensitive to pollens.

Contact dermatitis may be due to occupational causes, cosmetics, clothing, furnishings, pollens, plants and other organic substances.

An acne-like eruption due to specific food allergens has been noted.

Urticaria is usually due to foods and drugs, but is also reported to be due to sensitivity to the colon bacillus in the large bowel, parasites, contact with cosmetics and flowers, inhalation of pollens and physical agents. Angio-neurotic oedema is usually due to similar causes.

Food allergy should be considered as a possible cause in all cases of migraine and of those headaches which cannot be explained by other causes.

A condition of allergic toxæmia is described as severe fatigue, exhaustion, depression arising from pollen allergy and occurring during the pollen season. Food allergy, however, has been shown to be the most frequent cause of allergic toxæmia, and produces drowsiness, mental confusion, difficulty in concentration, irritability and fatigue.

When allergy is the cause of perennial hay fever, as it nearly always is, a small number of patients are difficult

¹ "Clinical Allergy due to Foods, Inhalants, Contactants, Fungi, Bacteria and Other Causes: Manifestations, Diagnosis and Treatment", by A. H. Rowe, M.S., M.D.; 1937. Philadelphia: Lea and Febiger. Medium 8vo, pp. 512. Price: \$3.50 net.

to control with treatment. Skin tests usually give no reaction in these few cases, and allergy to ingestants and bacteria as well as to inhalants is most likely to be the cause. Foods may give rise to seasonal symptoms in nasal allergy, and it is noted that itching is frequently absent in patients with nasal allergy whose condition is due to food.

The only surgical operation recommended for nasal allergy is the removal of obstructing polypi, the control of obvious infection in sinuses and the straightening of deviated septa.

Bladder allergy, enuresis, and uterine allergy are discussed, and it is interesting to note the author's view that pregnancy toxicosis may be the result of maternal sensitiveness to the products of foetal metabolism.

Arthritis, epilepsy, dizziness and Ménière's syndrome receive attention.

A special chapter is devoted to allergy in infancy and childhood. Rowe believes that food sensitization in infancy results from overfeeding, and especially from the forcing of foods that are not well tolerated. Fever resulting from food allergy is not uncommon both in adults and in children, and the importance of keeping food allergy in mind as a cause of symptoms in patients with all other types of disease is emphasized.

The botanical relationship of foods and its influence on skin reactions is given.

Many case histories are recorded in the appendix, together with valuable wheat, egg- and milk-free recipes.

This book on clinical allergy is unlike other works on allergy in that the author stresses the importance of food sensitivity from first to last while not neglecting the other causes of allergy. It is simply written, authorities on various subjects are quoted, and a large bibliography is given at the end. On account of its clarity and simplicity this book should be of considerable value to medical practitioners.

LOCAL ANÆSTHESIA.

THE reader is always gratified at meeting conciseness in a medical publication, and when this is associated with useful reading matter it is twice welcome. Such a combination is to be found in Dr. Arthur E. Hertzler's latest edition on "The Technique of Local Anæsthesia".¹

The fact that a sixth edition has been required indicates the popularity of the work. The book differs essentially from most others on local anæsthesia in that the author recommends the use of minimum amounts of solutions, not because of safety, but because a more accurate technique is possible and is needed than when large amounts of liquids are injected. Hertzler advocates infiltration anæsthesia rather than regional blocking because he secures thereby constriction of vessels, which aids in exact anatomical operating. In his clinic spinal anæsthesia has largely replaced local anæsthesia for operations below the diaphragm.

Hertzler's aim is to present the technique which he has found useful without making any attempt at conforming to the technique of others; and since the planning of the operation is more difficult than the technique required for producing the anæsthesia, he has laid himself out to present the difficulties likely to be encountered in order that the beginner may seriously consider whether or not his experience warrants his undertaking operations under local anæsthesia.

The author maintains that local anæsthesia is not "a stunt to be performed as an athletic event", but that it is to be selected only if it is the best for the patient. It is the proper selection of method, he states, that marks the skilled surgeon, and not his ability to do certain things with local anæsthesia. Surgeons who use local

anæsthesia will agree with him that it is practically never necessary to inject "Novocain" in a solution greater than 1% for any operation; and this is a point which we would emphasize. Although fatalities occurring during operations under local anæsthesia are happily rare nowadays, we agree with Hertzler when he states that when they do occur they should not be ascribed to the untoward effect of the anæsthetic without incontrovertible evidence. He gives warning against the use of cocaine by injection.

Hertzler does not hold with the practice adopted by certain surgeons of combining a local and a general anæsthetic. He believes that, generally speaking, the combination of these two is a confession of lack of skill or lack of judgement. When an operation is begun with local anæsthesia and eventually a general anæsthetic is used because of failure, it is clear that an error has been made in starting with a local anæsthetic. He strongly advocates the pre-operative use of narcotics and the use of a small calibre needle. He prefers a syringe of not more than five cubic centimetres capacity, because, as he points out, the greater the diameter of the barrel, the greater is the pressure required to force the liquid out of the needle, and this militates against a delicate injection of the fluid. The difficulty of gentle infiltration increases in proportion to the diameter of the piston of the syringe.

Surgeons may criticize Hertzler's method in a few instances; particularly do we consider that the section concerning operations upon the upper jaw is incomplete. We think that a blocking of the second division of the fifth nerve would remove certain unpleasantness which he evidently experiences when operating upon the maxillary sinuses. We think that in hoping for diffusion through the anterior wall of the sinus to provide anæsthesia of the contents of the cavity, particularly on the posterior wall, he falls short of the high standard which he attains in other parts of his book.

There are one hundred and forty-two illustrations in the book, and they are of the type which indicates that the author is a master of surgery under local anæsthesia. The subject is covered in two hundred and seventy-seven pages, with an index of six pages. In the past we have had much pleasure in reviewing publications by this eminent American surgeon, and we do not hesitate to recommend this book. We consider that every surgeon and senior medical student should possess it; it should especially be in the hands of the general practitioner in the country, for, except in a few particulars, it covers the subject of local anæsthesia in almost the minimum of space without sacrificing important details. The author has been very lucid and concise, and is to be congratulated upon reaching his sixth edition.

DIABETES AND ITS CONTROL.

DR. LAWRENCE'S "Diabetic Life" needs no introduction to the Australian medical profession. It holds a premier place as the most useful and practical guide to diabetic treatment available to the general practitioner and his intelligent patient. The tenth edition appears to differ from the last in one respect only, namely, the inclusion of a comprehensive and practical description of the nature and use of protamine insulin compounds.¹ Dr. Lawrence refers to the introduction of these substances as the most important advance in diabetic treatment since the introduction of insulin in 1922. While at first the use of protamine insulin is likely to confuse those doctors who were familiar with insulin and who used it successfully, in the long run the new treatment will prove simple and more easy to apply. From the outset it is emphasized that no patient should be put onto protamine insulin

¹"The Technique of Local Anæsthesia", by A. E. Hertzler, A.M., M.D., Ph.D., LL.D., F.A.C.S.; Sixth Edition; 1937. St. Louis: The C. V. Mosby Company; Australia: W. Ramsay (Surgical) Proprietary Limited. Super royal 8vo, pp. 284, with illustrations. Price: 30s. net.

¹"The Diabetic Life: Its Control by Diet and Insulin: A Concise Practical Manual for Practitioners and Patients", by R. D. Lawrence, M.A., M.D., F.R.C.P.; Ninth Edition; 1936. London: J. and A. Churchill Limited. Demy 8vo, pp. 239, with illustrations. Price: 8s. 6d. net.

without close individual observation. The appendix on protamine insulin compounds covers sixteen pages, and the subsections concern themselves with the following aspects of this therapy: chemical nature and physiological action, nomenclature, clinical use and dosage, diet, hypoglycemia, commencing treatment, emergency treatment and the manner of changing over from ordinary insulin. Two types of protamine insulin are described, Danish protamine insulin (the original preparation) and zinc protamine insulin. The advantages of their delayed action in smoothing out the blood sugar curve are described, and the disadvantage of irregularity of action, resistant hypoglycemia and incapacity of the new insulin to deal adequately with immediate post-prandial rise of blood sugar, are discussed. Lawrence, notwithstanding all this, makes the assertion that all but those whose diabetes is exceptionally severe can be maintained in good health by one injection a day either of zinc protamine insulin alone or with added soluble insulin. Individual study of each patient is necessary, however, to obtain the best results. The author describes clearly the steps that must be taken to establish the basal dose of zinc protamine insulin, that is, the dose which is just sufficient to produce a normal blood sugar content twenty-four hours after the retarded insulin is administered. The partition of the daily carbohydrate ration so as to provide for a uniform ingestion of sugar-producing foods is also described. It is pointed out that the latent period which exists before the retarded insulin becomes effective renders the substance unsuitable for emergency states, such as coma or pre-coma. One striking observation in patients receiving the new insulin is the more complete disappearance of ketosis than was noted with the older standard insulin. The effects of exercise on patients under control by protamine insulin may produce a more prolonged hypoglycemia than formerly. Such patients are therefore warned to take a small amount of extra carbohydrate when any violent or prolonged muscular activity is anticipated.

It should be quite possible for a medical practitioner, after reading Dr. Lawrence's advice, to undertake the care of a diabetic suitable for the retarded insulin. No doubt the next edition will contain a still larger and more authoritative section on this interesting innovation.

THE AVITAMINOSES.

IN view of the extensive work in connexion with the accessory food factors, and apparently contradictory findings by different workers, an authoritative statement of the present position is welcome. "The Avitaminoses", by Professor W. H. Eddy and Dr. G. Daildorf, is a publication which adequately fulfils this requirement.¹

The authors have presented in a concise manner not only a review of the work done by other experimenters and of the numerous papers that have appeared, but also a critical analysis of facts and theories in the light of their own work and the morbid changes in the various tissues of the body. It would be quite impossible in a treatise of convenient size to give a full account of the history of the accessory food factors, but there is quite sufficient reference in this book to increase the interest of the subject matter and to facilitate search of early papers. The book is divided into two parts. Part I deals with the vitamins and avitaminoses, and Part II with methods of assaying vitamin sources and of studying the avitaminoses. Full lists of the vitamin values of various foods are given in the latter section.

It has been established that there are six definite vitamins, and it has been postulated by other investigators that there are several more; but critical examination of the experimental data by the authors has resulted in their verdict of "not proven" for the last mentioned.

¹ "The Avitaminoses: The Chemical, Clinical and Pathological Aspects of the Vitamin Deficiency Diseases", by W. H. Eddy, Ph.D., and G. Daildorf, M.D.; 1937. London: Baillière, Tindall and Cox. Medium 6mo, pp. 348, with 29 plates. Price: 50s. net.

The method adopted for each vitamin has been to describe, *seriatim*, the nature of the vitamin, its functions in the body, the clinical and anatomical manifestations of deficiency in both laboratory animals and human beings, and the appropriate methods of treatment.

To the clinician the sections of greatest interest are those dealing with vitamin A deficiency, beri-beri, pellagra, scurvy, rickets and allied disorders. A clear, concise and illuminating account is given in each instance, and very strong evidence is produced of the frequent occurrence of subclinical forms of deficiency, which are much more difficult to diagnose than the fully developed diseases and are of vital importance to the individual. It is rather disappointing that in connexion with the study of the metabolism of calcium and phosphorus in vitamin D deficiency, only passing reference is made to blood phosphatase. An obvious inaccuracy is stated on page 232: "recovery is indicated by a slow rise of serum phosphatase" in cases of rickets. It is also stated that "in health the phosphatase concentration lies between 8.5 and 12.5 mgm. per cent"; but there is no indication of the mode of estimation, and the English figures are given in "units".

Hypervitaminosis and the toxic effects sometimes encountered from the administration of excessive doses of vitamin concentrates are discussed in detail; but it is probable that the most valuable sections of the book are those dealing with the essential criteria for accurate pathological diagnosis. The authors consider that some of the confusion in the interpretation of experimental findings has been due to insufficient consideration of these essentials.

The rôle of vitamins in the resistance to infection and their relation to blood regeneration are discussed, and the tables of the vitamin values of foods are very comprehensive and valuable.

The book is well illustrated with excellent photomicrographs; it is entertaining, instructive and provocative of thought, and we have no hesitation in recommending it as a necessary addition to the medical library of all interested in the advancement of medicine.

Notes on Books, Current Journals and New Appliances.

PROGNOSIS.

THE proprietors of *The Lancet* have produced many admirable volumes comprising articles reprinted from their journal. Readers will remember with interest the volumes that appeared on modern technique in treatment and on the clinical interpretation of aids to diagnosis, as well as other volumes on early mental disease and so on. In the issue of March 14, 1936, we drew attention to a volume devoted to prognosis. A second volume on prognosis has now appeared.¹ Prognosis is by no means the least important aspect of an illness with which a practitioner of medicine has to deal. Diagnosis and treatment are comparatively simple matters, especially for the younger practitioner, but prognosis is more difficult, and proficiency comes as a rule only with experience. In the preface to this volume the editor of *The Lancet* states that the invited authors have dealt only with subjects on which they had something to contribute, their contribution being based either on wide experience or on special study. No attempt has been made to cover the whole field of medicine and surgery. The subjects discussed in the present volume cover an exceedingly wide range, and no attempt will be made to enumerate them. We must content ourselves with recommending this book to the attention of the general practitioner.

¹ "Prognosis"; Volume II; 1937. London: The Lancet Limited. Demy 8vo, pp. 430. Price: 10s. 6d. net.

The Medical Journal of Australia

SATURDAY, DECEMBER 4, 1937.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

HOSPITALS AND ALMONERS.

To draw attention once more to the continually changing character of medical practice, particularly in hospitals, is unnecessary. Any medical graduate who has been in practice for more than a year or two cannot fail to see the change that is taking place in the attitude of his patients to their illnesses. Sick people and their relatives realize that treatment in a well-equipped modern hospital not only places at their disposal facilities otherwise difficult of attainment, but very often makes the running of the home easier. Apart from all other considerations, hospital treatment is undoubtedly an advantage for those of slender means whose homes are not suited for the treatment of a seriously ill person. Whether the increasing tendency on the part of all and sundry to seek hospital aid in all kinds of emergency is for the ultimate good of the patient need not at present be argued. The fact remains that hospitals are being called upon each year to cope with a larger number of patients than

they had to treat during the preceding year. Hospital authorities, if annual reports are any guide, appear to take a pride in the increasing number of their patients, in the average number of beds occupied each day, and, above all, in the number of surgical operations performed. This trend of modern life is known by the ugly name hospitalization—patients are hospitalized, even as they are “X rayed”, “cystoscoped” and “gastroscoped”. When a person is taken from his home and put into a hospital ward he is subjected to certain routine treatment; he may be and no doubt often is introduced to hygienic methods which were previously foreign to him. Under this treatment the chances are that he will get well much more quickly than if he is left in unsuitable surroundings at home. Unfortunately one of the aims of the modern hospital superintendent is to reduce the average length of stay—the hospitalization—of each patient. The patient has therefore, probably before he is really fit to do so, to return to his erstwhile surroundings. In order to make it possible for the poorer or less intelligent type of person to continue the treatment to which he has been introduced in hospital, almoners have come into being. An almoner may be defined as a liaison officer between the patient at home and the doctor in the hospital. His or her (an almoner is generally a woman) chief function is to keep in touch with the patient at home and to see that the medical attendant's treatment is being carried out. The work of hospital almoners has been discussed in these columns on previous occasions. The first almoner in England was appointed at the Royal Free Hospital, London, in 1895. Today no large modern hospital is complete unless it has an almoner service. In Australia in 1929 an Institute of Hospital Almoners was formed in Victoria. The system has been most successful, and trained almoners have been sent from Victoria to other States of the Commonwealth. The duties of an almoner have recently been summarized as follows:

1. To ensure as far as possible that poverty, home difficulties or lack of understanding shall not prevent patients from receiving the full benefit of treatment prescribed.

2. To act as a link between the hospital and outside agencies, State or voluntary.

3. To acquire a knowledge of the patient's circumstances and home conditions, by visiting and detailed inquiry, for the use of the medical staff.

4. To organize the after-care of the patient on discharge.

5. If required to do so, to check abuse of the hospital by patients (a) who are in a position to pay for private treatment, (b) who do not require special hospital treatment, and (c) who can arrange for home treatment.

6. If required to do so, to assess and collect patients' contributions towards treatment and maintenance in hospital.

Under these headings are included arrangements for supplying correct surgical appliances and for planning convalescence or holidays; for providing special diets; for raising financial assistance for patients in cooperation with outside agencies; for finding accommodation for country patients and destitute men and women attending in the out-patient department; for transport to and from the hospital; for institutional care and home treatment to free hospital beds for more urgent cases; for the constant watching and visiting of patients to prevent relapse and further hospital treatment, *et cetera*.

An Institute of Almoners has, recently been formed in New South Wales. Dr. R. B. Wade is the Chairman; the Honourable A. E. Colvin, M.L.C., M.B., Vice-Chairman of the Hospitals Commission of New South Wales, is Vice-Chairman; and Miss M. A. Telfer, B.A., is the Secretary. The objects of the institute are: (i) to select and train suitable candidates for the work of hospital almoners, (ii) to keep a register of trained almoners, (iii) to extend and develop the work of hospital almoners. Candidates to be trained as almoners are required to have reached the age of nineteen years before they begin their course, and no certificate is awarded to students under the age of twenty-two years. The course of study comprises a two years' training in social work with a school of social study recognized by the institute as providing a suitable course. In addition, a one year's training in hospitals is carried out under the direction of experienced almoners. Trainees also attend lectures on the social implication of disease, and tutorial classes in the principles and practice of hospital social work. It is clear that young women who undertake work of this kind must be actuated by something more than a desire to earn a living. At the same time it should be made known that work of this kind is available,

and that it provides a means of livelihood for some of the independent young women of the present day.

The demand for hospital almoners must grow. In at least two States of the Commonwealth organizations for their training have been formed. We hope that before long other States will do the same. Whatever is done should be done in each State through one central body. We can see no reason why institutes of almoners should not be affiliated in some way with the university of a State. Almoner training throughout Australia might then be put on a uniform basis, and trainees, on completion of their course, would be granted a university diploma.

Current Comment.

STITCH IN THE SIDE.

It will probably surprise most readers to learn that the common temporary complaint known as "a stitch in the side" was first described by Pliny the Elder. I. Newton Kugelmass, who has been investigating this apparently simple disability, mentions a number of authors much more recent than Pliny, who have attributed subcostal pain arising after effort to various causes.¹ The abdominal viscera in general, the spleen, the intercostal muscles, and anomalies in respiration, presumably giving rise to perverted muscular action, have all been blamed for the phenomenon. Looking back, most of us have suffered from this minor disability, particularly as school children, in which class the complaint is most frequently observed. That it is directly related to exertion is clear, and there is a definite connexion between overaction of the respiratory muscles and the onset of this curious subcostal pain. Kugelmass points out that children with this "stitch" may turn pale, but they localize their sensations with curious ease, in contradistinction to their customary vagueness in the case of most varieties of abdominal pain. Further, relief may be gained by steady deep breathing, particularly deep expirations. The author found that 56 school children out of 500 submitted to routine health examinations complained of periodic substernal pain, and in most cases the history was volunteered by the child or parent. These children were specially investigated in order to ascertain the factors likely to be involved. Pain was felt on either side, rather more frequently on the left side and occasionally on both sides. Though related to exertion, it was not invariably so, and sometimes could be induced

¹The American Journal of the Medical Sciences, September, 1937.

by meals or even a sudden movement by the child. One factor common to most of these children was poor posture; lordosis with some prominence of the abdomen was noted in nearly all. Another practically constant observation was some defect of breathing, that is, there was some limitation of respiratory function, and the application of muscular effort to breathing produced a poor response, frequently owing to lack of proper coordination between thoracic and abdominal muscles. Vital capacity proved to be below standard in all the children tested. Acting upon these findings, Kugelmass observed that appropriate postural and breathing exercises caused a definite improvement in the majority of the children, both as regards the occurrence of pain and the vital capacity. As might be expected, however, strenuous attempts made to correct faulty postures threw a strain on the rather slender musculature of these young subjects, and at first tended to increase their attacks of pain. After three months, during which daily postural and breathing exercises were carried out, the attacks ceased to occur in 48 of the 56 children. The interest in this inquiry lies in the recognition of the familiar "stitch in the side" as a reason for critical review of a child's physical development, and there can surely be no doubt that the encouragement of correct posture and correct methods of breathing must be of advantage to growing children.

MONOCYTIC LEUCHEMIA.

It is twenty-four years since the first case of monocytic leuchæmia was reported, and the literature now contains over 150 case reports. One of the interesting features of this unusual type of leuchæmia is that differential diagnosis must be made between it and infectious mononucleosis, otherwise known as glandular fever. This latter disease does not appear to have been observed in Australia as frequently as in some other parts of the world; but even so it is important that there should be no confusion between a disease which is benign and one which is fatal. Monocytic leuchæmia has been described by some as a reticulo-endotheliosis, but this name is open to objection as it makes assumptions as regards the origin of the monocytes. One of the interesting cases in the literature is one in which a patient suffering from this form of leuchæmia sustained an injury to the leg which caused a septicæmia from which he died; and it was held in court that compensation should be allowed on the grounds of the shortening of the patient's expectation of life. Edwin E. Osgood has reported six cases and reviewed 120 of those from the literature.¹ In one of these cases there were cutaneous lesions of a curious type, not merely a petechial rash, but a condition resembling an *erythema multiforme*. These cutaneous lesions have been noted in other cases, and seem to be specific for the disease,

for they are different from the skin infiltrations of other types of leuchæmia. On section they consist largely of monocytes and their precursors. Another type of cutaneous lesion is the result of infections due to staphylococci, such as boils and carbuncles, which occur too frequently to be due to mere coincidence. Apparently the disease may occur at any age, the extremes in the literature being eleven months and seventy-eight years; but there was a great preponderance of males in the reported cases. Petechiæ on the skin are common, so also is enlargement of the lymph glands, and enlargement of the spleen and liver as a rule can be elicited. The most characteristic symptoms are pallor, weakness and fever, the fever sometimes rising to a considerable height. The white cell count is as a rule considerably raised, sometimes very greatly, but occasionally there is a leucopenia. Osgood found difficulty in reviewing the recorded cases in evaluating the differential counts because authors did not follow a standard procedure in separating the mature from the immature cells. However, as in other forms of leuchæmia, it is the qualitative rather than the quantitative changes which are important, and now that the condition is better known it will probably be recognized more frequently, especially if examination of the bone marrow is carried out. This form of investigation can easily be accomplished by sternal puncture, and it seems as though this simple procedure will be much more widely used in the future in places where full laboratory facilities are available. Studies of the bone marrow in this disease show, in Osgood's opinion, that the mature monocyte arises from the precursor cell in the marrow, the monoblast, and develops through the intermediary stage of the promonocyte into the mature blood cell. The recognition of these cells is difficult, or at least is a matter for an expert hæmatologist, and full descriptions are given in this article and others in the literature.

The importance of recognizing this disease is that it tends to run an active course to a much greater extent than other forms of leuchæmia, and in this series the shortest duration recorded was ten days and the longest four years, the average being less than six months. One of the most striking features has not yet been mentioned; that is, swelling of the gums. This has been a prominent sign in a large proportion of the cases, and indeed quite a number of patients have actually consulted a dentist before seeking medical advice. In some instances there is simply a well-marked gingival swelling, but in many others severe infection is superadded, causing a gangrenous stomatitis such as that seen in agranulocytosis. Attention should be drawn to the importance of thinking of other general conditions such as blood diseases when any unusual appearance is noted in the mouth. Patients suffering from polycythæmia have also been known to consult dentists. It is unfortunate that as yet no useful treatment can be given for this severe and fatal disease, but it should be sought, and any cases that are discovered should be reported.

¹ Archives of Internal Medicine, June, 1937.

Abstracts from Current Medical Literature.

PÆDIATRICS.

Exophthalmic Goitre in Children.

ISRAEL BRAM (*Archives of Pediatrics*, July, 1937) records a series of 128 cases of exophthalmic goitre in children twelve years old and under. The ratio of females to males was sixteen to one. The symptomatology, especially the thyroid swelling, exophthalmos, tachycardia and nervous phenomena, is somewhat exaggerated as compared with that of adults. Nevertheless the diagnosis of the condition in children is often difficult owing to the comparative rarity of the disease in the very young. The author states that while the exciting cause of exophthalmic goitre in adults is usually a psychic trauma, in children it is commonly a focal or general infection. Since young children are apt to need their entire thyroid for future growth and development, treatment should be conservative and should consist of elimination of discoverable infective foci, an ample low animal protein dietary, a proper rest routine and a few carefully selected medicaments.

Hæmolytic Streptococci in the Throats of Children.

C. M. BURFEE (*Archives of Pediatrics*, August, 1937) has investigated the incidence and significance of hæmolytic streptococci in the throats of children from an examination of throat cultures from 148 white and 152 coloured children over a period of one year. Cultures were also examined from throat swabbings of 63 doctors and nurses. The average carrier incidence for *Streptococcus hæmolyticus* in patients was 11%, and in the staff 6%. Within certain limits the incidence of *Streptococcus hæmolyticus* in a paediatric ward can be controlled. There was no definite relation between the incidence of the streptococcus in the throats of the staff and in those of the patients. There was a higher incidence in the patients with tonsils than in those without them, but there was no relation between the condition of the throat and the incidence of the streptococcus, nor was there any definite relation between the various illnesses and the presence of hæmolytic streptococci in the throat.

Lead in Certain Coloured Chalks and the Danger to Children.

C. M. JEFFCOAT (*Canadian Public Health Journal*, August, 1937) states that since 1930 lead poisoning in children has been frequently recognized in Canada. In 1932, of 16 children admitted to hospital in Montreal, two died. In Toronto, 23 patients were treated over two years. Ten had cerebral symptoms, and of

these, five died, one case resulted in mental retardation; 13 were latent cases. Children are more susceptible to lead than adults. Their resistance varies; but in one fatal case only two-thirds of a gramme had been ingested. In the large majority the children were from one to two and a half years old, lead paint being blamed. Factory legislation in 1932 insists on all lead-containing paints being so labelled. Lead-free paints are selected for babies' cots, play-pens and toys; but the indiscriminate use of lead paints is still dangerous. Since 1933 the number of admissions to the Children's Hospital, Toronto, has remained at seven. In analysing coloured chalks, the author found relatively large amounts of lead chromate in yellow, orange and green chalks, a single stick of chalk containing 0.2 to 5.92 grammes, an average of 1.1 grammes of chromate of lead or 0.7 gramme of metallic lead, while red, blue, brown and black chalks were free from lead. The danger from dust or from nibbling these yellow chalks *et cetera* is obvious.

Infection of the Renal Parenchyma from the Pelvis of the Kidney.

HENRY F. HELMHOLT (*American Journal of Diseases of Children*, July, 1937) describes a group of experiments which show that stasis in the urinary passages is the determining factor in the breaking through of an infection from the pelvis of the kidney to the renal parenchyma. The experiments show characteristically that, even with the intense pyelitis produced by direct injection of bacteria into the pelvis of the kidney, a barrier exists to the spread of infection into the renal substance. They bring out most clearly that in the unobstructed urinary tract such an entity as pyelitis can exist, that the kidney has a protective mechanism by which the spread of infection is kept out of the kidney proper, and that this barrier seemingly remains intact as long as there is no obstruction to the outflow of urine. It is broken down in less than twenty-four hours when there is obstruction. The parenchyma rapidly becomes infected from the pelvis by way of the perivascular lymphatic structures and by direct passage of the organisms through the pelvic lining over the parenchyma. Thrombosis forms an important feature of the renal changes. The experiments emphasize the importance of maintaining adequate drainage in all cases of infection of the urinary tract. They also show that in the acute stages of urinary infection the all-important object of treatment is adequate production of urine to wash out the thick purulent exudate and so to prevent stasis.

Poliomyelitis in Manitoba.

F. W. JACKSON (*Canadian Public Health Journal*, August, 1937) discusses the control measures adopted in the 1936 epidemic of poliomyelitis in Manitoba. During June poliomye-

litis appeared at Morton in the south-west, and secondary cases soon occurred there and throughout the province; 539 cases were reported and 33 patients died (6.1%), 102 suffered residual paralysis (19%) and 404 recovered completely (74.9%). Only 40 (7.4%) will sustain a major disability. Serum prepared locally from selected fasting donors was pooled, but not filtered, and 20 cubic centimetres were given intramuscularly. Jackson claims benefit when serum is given within thirty-six hours. Of 262 patients receiving serum, 92.7% recovered completely, 5.5% suffered residual paralysis, and 1.8% died. Of 119 patients receiving no serum or none before paralysis occurred, 36.1% recovered completely, 52.1% showed residual paralysis, and 11.8% died. The younger age groups benefited most, the case fatality being 1.5% for those under 14, 8.5% for those over 14 years of age. Paralysis occurred in 5.4% of those under 14 and in 10.2% of those over 14 years of age. Nurses undertook a house-to-house visitation and an intensive programme of education. They also gave instruction on the use of the picric acid nasal spray.

C. R. DONOVAN (*ibidem*) discusses the epidemiological features. He gives figures showing the concentration in Manitoba. Other provinces with more than 25 cases were Ontario 238, Quebec 116, Saskatchewan 77. In Manitoba 539 cases occurred, a rate of 75.7 per million of population. Eight years previously (1928) another large epidemic of 434 cases and 49 deaths occurred with minor outbreaks between. The apparently low fatality rates in epidemic years suggest a number of unrecognized and unreported cases in these other years. In the first case which occurred in Morton there was no previous history of personal contact with neighbours. A previous case had been reported and the patient died in four days some seven or eight weeks previously. The son of two neighbours of the Morton patient who had made contact became ill four days afterwards, and his sister, who visited the home, five days later on. In rapid succession cases appeared in the area, in six weeks 1% of the population being affected. The explosive nature of the epidemic continued to show itself, groups of cases occurring along the main highways. In Winnipeg the case rate in the whole epidemic was 38 per 100,000 (84 cases), and in the Morton area 2,000 per 100,000 (61 cases). In 1928 Winnipeg had had 233 cases and none had occurred at Morton for twenty years. In Morton the late adolescents and adults showed a heavier incidence. Males predominated, especially in ages under ten years. Of 460 homes, 40.3% recorded one case only; 43, two cases; eight, three cases; five, four cases; and one, five cases. A higher proportion of rural homes showed multiple cases. These secondary cases occurred in two to

seventeen days, but chiefly in three to eight. No nurse or hospital attendant became infected. Of the specimens of spinal fluid tested, 22% showed cell counts of ten or less.

ORTHOPÆDIC SURGERY.

Fracture of the Head of the Humerus.

J. W. SEVER (*The New England Journal of Medicine*, June 24, 1937) discusses the results obtained in 91 cases which were treated by various methods by many men and under varying conditions, and also reviews the literature. He discusses these cases in nine classes, arranged according to the anatomical combination of possible injuries to the various portions of the upper end of the humerus. He notes that very few authors at present advocate the abduction method of reduction and after-treatment, for which he confesses a predilection. He maintains that none of the splints described in the literature holds the arm in sufficient abduction and outward rotation. Some authors advise replacing the head following a fracture-dislocation; but others, after removing it, use a Murphy fat and fascia transplant to ensure later motion, and record excellent results, provided muscular attachments are reestablished. The author describes this procedure as radical and unnecessary, and many times impossible. He draws attention to the fact that too much abduction is liable to cause angulation at the site of fracture. Some authors believe that the long head of the biceps is the controlling force in establishing and maintaining reduction and position of the short and proximal fragment, and that abduction makes it difficult to obtain approximation and still more difficult to preserve it. They believe that the fracture should be reduced under local anaesthesia, and that traction with the arm dependent, the forearm in a sling and a swathe around the limb is correct practice. All authors unite in using massage from the start, and commence active exercises within the first two weeks. The author expresses a doubt whether restoration to normal function ever occurs in the average fracture involving the head and neck of the humerus under any treatment. It is important for comparison to have X ray pictures of both shoulders in the antero-posterior and axillary planes. The mechanics of these fractures is discussed by the author, and various methods of applying traction are described. He also describes a splint designed by himself which is easily adjustable to maintain the correct position after reduction.

Arthroplasty of the Elbow.

SUMNER M. ROBERTS AND ROBERT J. JOPLIN (*The New England Journal of Medicine*, April 15, 1937) discuss the

results in a series of patients on whom arthroplasty of the elbow had been performed. The technique used was that of Dr. Phillip Wilson, and a majority of the patients suffered from chronic rheumatoid arthritis and were inmates at the Robert Brigham Hospital. The elbow joint was attacked first in these patients, many of whom suffered from polyarticular involvement, in order to allow recovery of the power to perform the small daily tasks of life. In every instance the general arthritic process had been quiescent for at least six months. The authors admit that the end result has not been a normal elbow joint, but they claim that there has been considerable improvement in function. The series of operations consisted of twenty-three arthroplasties, and sixteen of the patients had elbows that were completely ankylosed before operation. At the time of operation the youngest patient was fifteen and the oldest fifty-one years of age. The average gain in range of movement was 100°, the greatest being 155° and the least 25°. In most cases the maximum gain in motion was obtained within three months after the operation, and in all before the end of a year. There was no tendency for the range of movement to decrease as the years went on. The range of pronation and supination varied, and from this point of view the cases are divided into three groups. First, when neither the head of the radius nor the lower end of the ulna was resected, the patient lost 55° of rotation; secondly, when the head of the radius was removed but the ulna was left intact, nine patients gained an average of 44° of rotation; and thirdly, when both the head of the radius and the lower end of the ulna were resected, five patients gained an average of 80°. The strongest and most stable joints in this series were those that had 100° or less of flexion. In assessing results the authors consider the cases from the point of view of gain in function, and before a success is claimed there must be agreement between patient and surgeon. From this point of view there were twenty successes out of twenty-three cases. Failures are discussed under the heading of technique and judgement. One failure under the former heading was due to the failure of the reattachment of the triceps to hold, and two failures under the latter heading were due to selection of unsuitable cases, both of which followed fracture and both of which resulted in a weak joint. The operative technique is described in detail, and a list of illustrative cases is quoted.

Surgical Bone Grafting.

S. OKELL (*The Journal of Bone and Joint Surgery*, October, 1937), instead of using fresh autoplasmic bone for grafting, employs three other forms of graft which he has called *os purum*, *os novum* and boiled bone. Each of

these has its special range of use, its advantages and disadvantages. *Os purum* is bone which has been freed of fat, connective tissue and proteins, but not entirely of all the collagenous matrix. It is thus composed of the calcium framework of dead bone. *Os novum* is immature living bone tissue with great proliferative power and is produced by implanting a long narrow piece of *os purum* subperiosteally over the antero-medial surface of the tibia for about two months. When this is removed a profuse growth of new soft vascular bone is found in the clefts between the periosteum, the *os purum* and the tibia, and this is called *os novum* and is transplanted to the desired place. Boiled fresh bone contains fat, connective tissue and proteins, and is more satisfactory than boiled dried bone. The author maintains that success in grafting depends upon the manner in which the living connective tissue transplanted with the bone reacts after the implantation, as well as upon the reaction of the connective tissue in the bed of the graft. The deep layer of periosteum and the endosteum, as well as the connective tissue in the Haversian canals, reacts to stimulation from the calcium framework of an implant by forming new bone within fourteen days after the implantation; the connective tissue lying outside the skeleton can only with difficulty be induced to form bone in response to stimulation by the calcium of the implant. Unless the new bone takes part in the bone physiology, it will be resorbed together with the calcium framework of the implant. The author has used *os purum* for extraarticular arthrodesis, tuberculous osteitis of the hands or feet, and in cases of bone cyst and osteitis fibrosa, and also as a graft to fill up bone defects after resection or to establish osteosynthesis. When extrasketal connective tissue separates two bones which are to be joined through transplantation, living bone implants, such as *os novum*, should be used. Such cases are those in which osteosynthesis of the spinous processes, osteosynthesis in pseudoarthrosis or arthrodesis in articular tuberculosis is required. Transformation of the new bone formed after implantation of *os novum* proceeds more uniformly than it does after transplantation of fresh mature bone, and the author has not observed fracture of *os novum* in any of his cases. In chronic osteomyelitis and bone tumours he has dissected the diseased bone, boiled it in a physiological salt solution to kill the bacteria or tumour cells, cleared it of the diseased tissue masses, and replanted it to give mechanical support until new bone has been developed. Healing usually took from six months to one year, but the patients were up and about in from three to six months after operation, and there were no recurrences. The best method of exposing bone is to loosen the periosteum from it, but not to separate the periosteum from the soft parts lying outside.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held at the Royal North Shore Hospital of Sydney on June 17, 1937. The meeting took the form of a series of clinical demonstrations by members of the honorary staff. Parts of this report appeared in the issues of November 20 and November 27, 1937.

Calcified Myoma Uteri.

Dr. H. Z. THROSBY showed a woman, aged sixty-one years, who had been admitted to hospital on May 11, 1937. She had suffered from frequency of micturition during the few years prior to admission. This had become more pronounced during the previous few weeks. She had no burning or scalding on micturition. She had recently become constipated.

The patient was very fat; there was no abdominal tenderness, and no masses were palpable. The cervix was small and pointed downwards and forwards. The uterus was retroverted. A large stone-like mass could be felt in the posterior fornix. At operation a hard calcified myoma, about the size of an orange, was found, separate from the uterus, but securely bound down to it by firm adhesions. The uterus was small and atrophic. Total hysterectomy was performed. The patient made an uneventful recovery.

Melanoma.

Dr. Throsby's next patient was a woman, aged twenty-four years, who had been admitted to hospital on February 21, 1937, with a provisional diagnosis of cholecystitis.

She had been in moderately good health until three months prior to admission, when she had commenced to vomit large quantities of green material, mainly in the early morning. Vomiting had been persistent, and had occurred practically every day since the onset. She had pain in the right hypochondrium, just below the costal margin, which occasionally passed through to beneath the right scapula.

She stated that she had lost weight and that she had had a cough for one month. She had never been jaundiced, and did not suffer from flatulence, but had occasional heartburn. Her bowels acted regularly, and the motions were normal in colour. She had last menstruated on December 26, 1936. The menstrual cycle occupied 28 days, the flow was moderate, and the duration of flow was three or four days. She had one child, aged three years.

The patient was thin. The skin had an unusual bronze appearance. The tongue was clear, but reddened. No masses or tumours were palpated in the abdomen. Murphy's sign was elicited. The liver and spleen were not palpable. The pulse rate was 96 per minute; the rhythm of the pulse was regular, and its amplitude good. The apex beat of the heart was in the fifth intercostal space, 8.75 centimetres (three and a half inches) from the mid-line; the heart sounds were of good quality; no murmurs were detected. No abnormality was detected in the respiratory or nervous system. The colour of the urine was brownish-red; its specific gravity was 1.024; it contained no abnormal constituent, and did not blacken after being allowed to stand for a time. X ray examination made on February 26, 1937, revealed no lesion of the stomach or duodenum, and no tuberculous lesion of the lungs.

She continued to vomit every morning; she was unable to keep fluids down; therefore, on March 1, 1937, she was given a fat-free diet. At X ray examination on March 3, 1937, no shadow of the gall-bladder was visible.

On March 4, 1937, examination *per vaginam* was made. The vaginal walls were lax; the cervix was small, hard, slightly lacerated, pointing downwards and mobile; the uterus was slightly enlarged, firm, anteverted and ante-flexed; there was a mass in the right postero-lateral fornix, separate from the uterus and tender to palpation; there was a smaller mass that was not so tender in the left lateral fornix.

On March 9, 1937, Dr. Throsby saw the patient for the first time. He made a diagnosis of double pyosalpinx.

On March 11, 1937, he performed colpotomy. A quantity of blood-stained fluid escaped. Double oophorectomy was then performed. There were two deeply congested ovarian cysts, which had undergone torsion. There was a quantity of free fluid and blood in the peritoneal cavity. The cysts were about the size of an orange; the left had ruptured.

On March 12, 1937, the pulse was very rapid, and the patient was pale and moist with sweat; she was still vomiting. A transfusion of 600 cubic centimetres of citrated blood was given.

On March 14, 1937, the pulse was still rapid; but the patient was not vomiting, and she felt better. The red blood cells numbered 5,100,000 and the white cells 8,800 per cubic millimetre. The haemoglobin value was 12.3 milligrammes per 100 cubic centimetres.

On March 28, 1937, the pulse was still very rapid and weak, and the systolic blood pressure was 110 and the diastolic 90 milligrammes of mercury. The blood urea content was 21 milligrammes per 100 cubic centimetres.

Histological examination of the ovaries was made. This revealed extraordinary proliferation of the luteal cells, which were found in the centre of the mass. A great deal of blood was present, and there was a large deposit of pigment. The margin of the mass resembled an ordinary luteum cyst. The honorary pathologist thought that the condition might be one of bilateral luteum cysts in which there was a pseudo-neoplastic proliferation of cells; but he was unable to exclude the possibility of a true neoplastic process.

On April 12, 1937, examination of the urine revealed the presence of melanin. On April 13, a hard lump, about the size of an almond, was discovered on the right side of the neck; it was not tender to palpation. The evidence of cardiac failure became more pronounced. On April 14, the patient's relatives insisted on her removal from hospital. On April 23, 1937, the honorary pathologist expressed the opinion that the melanuria suggested the recurrence of the tumour, and that the probable diagnosis was melanotic sarcoma.

A MEETING of the Western Australian Branch of the British Medical Association was held at the Perth Hospital on August 18, 1937. The meeting, which was arranged by Dr. R. LE P. MUECKE, chief resident medical officer, took the form of a series of clinical demonstrations. Dr. L. A. HAYWARD, the President-Elect, occupied the chair.

Secondary Syphilis.

Dr. ROY LE P. MUECKE showed an aboriginal girl, aged fourteen, with flat, broad condylomata on the vulva and perineum. They were somewhat elastic to the touch; the scrapings did not reveal any spirochaetes. The patient refused to answer any questions. Dr. Muecke believed the condition to be secondary syphilis. Dr. Harke considered the lesions to be granulomata and was treating her with injections of tartar emetic. Subsequently the Wassermann test gave a strongly positive reaction, and the condition began to clear up rapidly with antisyphilitic treatment.

Coronary Occlusion and Syphilis.

Dr. W. H. NELSON showed a male patient, aged forty-two years, who had first complained of a sudden onset of substernal pain lasting one and a half hours. The heart was enlarged and aortic murmurs were present, with all the signs and symptoms of systemic failure. An electrocardiogram revealed coronary occlusion. The Wassermann test gave a positive reaction and there was a history of primary infection in 1917. A large goitre had been present from childhood. (The patient came from a goitrous district in Austria.) He was responding well to injections of mercury and to iodide of potassium given *per os*.

Discussion took place as to the prognosis and regarding the use of arsenical preparations in addition to mercury and potassium iodide.

Cardiac Failure.

Dr. Nelson showed another patient, a male aged sixty-four years. Four years previously, following a syncopal attack, he was breathless on exertion, but for the previous three weeks he had been breathless while at rest. The heart was enlarged. Aortic regurgitation was present, and tachycardia with auricular fibrillation was also noted; the arteries were hard and tortuous, and the electrocardiogram revealed a poor myocardium with a suggestion of coronary occlusion. The systolic blood pressure was 170 and the diastolic pressure was 60 millimetres of mercury. The Wassermann test had failed to yield a reaction on several occasions. The patient was being treated with digitalis.

Lesion of the Eighth Dorsal Vertebra.

Dr. D. G. McWhae showed a female patient, seventy-two years of age. She had always been well except that thirty-four years ago she had fallen on her back and fractured her coccyx. Three months previously she suddenly experienced severe back and girdle pains. The onset was "like two swords being thrust through the shoulders and back". The pains had gradually lessened, but the legs had become progressively weaker, and now she was so weak that she could not get out of bed. During the previous few days her legs had been numb, and from a level of about two inches above the umbilicus downwards there was comparative analgesia to pin-pricks. There was a double Babinski reflex with slight ankle clonus. X ray examination revealed collapse of the eighth dorsal vertebra. As a result of lumbar puncture the patient complained that she had got worse. The cerebro-spinal fluid, apart from some increase of protein, was normal. Thorough investigation had failed to reveal any evidence of primary or secondary malignant disease. Dr. McWhae showed the patient because of the resemblance of the condition to Kummel's disease; but in view of the age of the patient and the absence of any history of recent trauma to the back he thought that the case would eventually be found to be one of malignant disease.

Dr. Frank Gill was averse to laminectomy because of the patient's age. He advised the use of a spinal brace with hyperextension.

Dr. J. P. Ainslie regarded the onset as too rapid for Kummel's disease. He suggested the possibility of malignant disease and extrusion of the *nucleus pulposus*. He would consider laminectomy in spite of the patient's age.

Dr. G. C. Moss suggested the possibility of multiple myelomatosis. He urged examination of the urine for Bence Jones protein, and X ray examination of other bones. It was difficult to exclude malignant disease, which was the most likely diagnosis.

The general opinion prevailed that laminectomy should be performed.

Papilloma of the Bladder.

Dr. Frank Gill showed a male patient, aged sixty-eight years, who had been a billiard-marker and publican. He presented gouty tophi in his ears, elbows, hands and feet. "He used to chalk his billiard cue with his elbow." He reported in the first place complaining of hourly nocturnal micturition. The stream was good, but there was some precipitancy and also a little hæmaturia at times.

Examination *per rectum* revealed some slight enlargement of the prostate, but the hæmaturia was a clear indication for cystoscopy. The cystoscope revealed a papilloma of the bladder, but no intravesical enlargement of the prostate. The blood urea was 80, the uric acid six milligrammes per 100 cubic centimetres. Dr. Gill had treated the growth by diathermy, starting from the ends and leaving the pedicle till last.

The patient was presented, Dr. Gill explained, to emphasize the importance of cystoscopy. Had the adenoma of the prostate been a little larger, the surgeon might have been tempted to perform prostatectomy, which would have meant the smashing up of the papilloma with resulting papillomatosis.

Abscess of the Lung.

Dr. McWhae also showed a male, aged fifty years, who had had a cancer of the right vocal cord removed by laryngo-fissure and the diathermy knife in November, 1935. The patient had remained well until two months previously, when he developed a cough. This was at first dry and then the sputum was copious, brown and putrid. He had pain in the left side of his chest. He would periodically feel that something was accumulating, the pain would recur, and then he would cough up a large quantity of sputum, which was followed by relief of pain. Dr. A. W. Farmer had examined him with the bronchoscope, but had not been able to find any abscess cavity, and reported that all bronchi examined were free of pus. There were extensive physical signs at the left base. There were no tubercle bacilli or cancer cells in the sputum. The patient was losing weight and had been too weak to get up since the onset of the illness. Dr. McWhae considered the condition to be an abscess of the lung, and an X ray examination on the morning of the meeting revealed an abscess cavity with a fluid level, although previous X ray examinations had given indefinite results.

Dr. G. C. Moss considered that the condition started as pneumonia and that an abscess had developed. Malignant disease had been eliminated as far as possible, and therefore the condition should be treated as an abscess.

Discussion as to the treatment followed, postural drainage, bronchoscopic suction, and external drainage being considered.

Dr. W. H. Nelson advocated intramuscular injections of eucalyptol in olive oil.

In the absence of Dr. Bruce Hunt, Dr. G. C. Moss showed on his behalf a man, aged thirty-five years, who, about two years previously, had had a fairly acute pain in the right hypochondrium. A cholecystogram, recorded in the country, was indefinite. As the pain was increasing in severity, the patient came to Perth. The pain became agonizing about this time, and soon afterwards, following a tickling sensation in the throat, he coughed up a considerable amount of sputum. His condition gradually improved, but he had had cough, with sputum, off and on ever since, and as well had had several pleuritic attacks, was occasionally feverish, and there was slight hæmoptysis at times. X ray films were shown demonstrating residual abscess cavity in the lower lobe of the right lung.

Dr. J. P. Ainslie stated that he had seen this patient eighteen months previously in consultation. He thought that the condition was an amœbic hepatic abscess which had ruptured into the lung. The patient had never improved since then. He advised investigation with lipiodol and bronchoscopy. If other treatment failed he would advise external drainage, as the abscess was peripherally situated.

Dr. D. M. McWhae said that, even at this stage a course of emetine should be given.

Dr. G. C. Moss saw no urgency for operation, as the condition had already existed for eighteen months; he advised some short wave therapy with emetine injections. After a month, if there was no improvement, he would advise external drainage.

Dr. R. Le P. Muecke urged a complete course of emetine, and considered short wave therapy useless in a long-standing case such as this. He also advised bronchoscopic drainage and postural drainage. If that failed, surgical treatment should be invoked.

Dr. G. C. Moss then gave the history of a recent case, supporting it with X ray films. The patient, a male aged thirty-five years, had had an attack of diarrhoea four months previously. At the end of ten days the attack subsided, but he was far from well, and consulted a doctor in Perth. A diagnosis of appendicitis was made, and on his return to the country the appendix was removed.

Some time prior to operation he had also had several attacks of pain in the right subscapular and right shoulder region. Three days after operation (seven weeks prior to the present meeting) he coughed a considerable amount of thick blood-stained sputum and became feverish.

He had brought up an average of a pint of reddish sputum in the twenty-four hours ever since. He had come to Perth eight days previously.

It was significant that the sputum, although plentiful, had not been found to contain tubercle bacilli on six occasions. A clinical diagnosis of abscess of the lower zone of the right lung was made, and this was supported by X ray examination. The question to be decided, then, was: Was this a post-operative lung abscess, or could everything be correlated on the basis of an amoebic infection causing a liver abscess which had ruptured into the lung? The point was settled when Dr. Michaels found amoebae in the sputum, and the patient's response to treatment in the first eight days had been gratifying. His appetite was excellent and he was putting on weight. The sputum was now down to ten ounces daily. The treatment had been by emetine and postural drainage.

Dr. Ross cited Rogers and Megaw, who stated that the prognosis in these cases was good when the patients were treated with emetine. He thought bronchoscopy unnecessary in this case, since there was no question of a foreign body, a post-operative infection or carcinoma. Moreover, the drainage was very free. The possibility of a cavity remaining had to be borne in mind, but it was hoped that the energetic use of emetine and postural treatment would lead to a complete cure.

Malignant Disease of the Bladder.

DR. J. P. AINSLIE presented two specimens of vesical carcinoma removed from patients on whom total cystectomy had been performed. He stated that the intense pain and frequency of micturition which such patients suffered made their lives almost unendurable. In his experience the results gained by deep X ray therapy or by radiation from implanted radium had been disappointing. The suffering of some patients had been aggravated owing to the development of intractable cystitis, and in no case had a cure resulted.

Dr. Ainslie considered that partial or total cystectomy presented the only rational line of treatment. Partial cystectomy should be attempted only for carcinoma in the early stages, as the actual spread in the vesical wall was always more advanced than it appeared to be on examination with the cystoscope.

If total cystectomy was to be performed, the urinary stream had to be diverted; nephrostomy or transplantation of the ureters into the skin of the abdominal wall was intolerable to the patient, and transplantation into the lumen of the sigmoid colon should be done if the age and general condition of the patient justified this procedure. In the treatment of *ectopia vesicae* transplantation was done in two stages, one ureter being transplanted at each operation, but if the transplantation was performed for vesical carcinoma, it was justifiable to transplant both ureters in one stage, the bladder being removed two to four weeks later.

Dr. Ainslie explained that various principles had to be adhered to; tubes, such as the ureters and common bile duct, were guarded by a valve-like opening to prevent reflux from a high pressure to a low pressure viscus. By following the Coffey technique it was possible to reproduce this valve-like opening, and the risk of renal infection was very greatly diminished. An incision was made in the wall of the sigmoid colon through the serous and muscular coats. At the bottom of this incision a minute opening was made in the mucosa through which the ureter was passed into the lumen of the bowel. The serous and muscular coats were then sutured over the ureter. During peristalsis the mucous membrane was pressed against the ureter, preventing reflux of bowel content. If both ureters were transplanted at one stage it was necessary to split the ureters by means of large ureteric catheters which were drawn out through the anal opening. Unless this precaution was taken oedema might result in back pressure on the kidney and renal failure. Dr. Ainslie also stressed the importance of cleaning the bowel as thoroughly as possible prior to the anastomosis.

The first specimen removed was an extensive papillary carcinoma, involving the greater portion of the bladder

wall, which had been removed from a patient of sixty-nine years of age. In this case the ureter had been transplanted into the skin of the abdominal wall, as the patient had refused to undergo more than one operation. The patient died fourteen days after operation from pyelonephritis and renal failure.

The second specimen consisted of an extensive infiltrating carcinoma involving two-thirds of the bladder wall. It had been removed from a patient aged fifty years. Four weeks prior to cystectomy the ureters had been transplanted into the sigmoid colon. Progress had been satisfactory and the patient had full control of his bowels, which were opened every three to four hours.

DR. N. ROBINSON discussed a case of vesical carcinoma treated by the implantation of radon seeds. The result had been most satisfactory. Clinically the patient was free of symptoms, and cystoscopy revealed no sign of disease.

Hernia of the Diaphragm.

Dr. Ainslie next proceeded to show a series of skiagrams of a case of traumatic hernia of the left dome of the diaphragm. Six months previously a boy of fourteen years had been involved in a collision with a motor car while riding a bicycle. He was admitted to hospital in an extremely shocked condition and was regarded as suffering from a traumatic pneumothorax. X ray examination at this stage did not reveal the condition. Convalescence was rapid and he was discharged after fourteen days without any symptoms. He was readmitted to hospital four weeks later, complaining of upper abdominal pains and vomiting. X ray examination revealed that the left pleural cavity was completely filled with abdominal organs; the stomach reached to the level of the first rib, and the shadows of large and small intestine could be seen in the pleural cavity.

At operation by the transthoracic approach a large tear in the diaphragm was discovered extending outwards from the oesophageal hiatus for about four and a half inches. The abdominal contents were reduced and the opening in the diaphragm was repaired with strong interrupted silk sutures, after crushing of the phrenic nerve as it crossed the pericardium.

In spite of negative pressure drainage, a large pleural effusion and pneumothorax followed the operation, with almost complete collapse of the left lung. Later skiagrams showed, however, that the lung had completely expanded, and beyond slight dyspnoea with extreme exertion, the boy was now completely free of all symptoms.

Cystic Disease of the Spleen.

DR. LE P. MUECKE showed for DR. LESLIE LE SOUEF a specimen removed from a child, aged fourteen years, who had been admitted to hospital on July 26, 1937. She had been sent home from school by the nurse on account of a swelling below the left costal margin. This swelling extended from below the ribs right down into the iliac fossa. The child appeared quite well. Tumour of the kidney, tumour of the spleen and retroperitoneal growth were considered in the diagnosis. Renal tests and renal investigation revealed no abnormality. Examination of the blood and X ray examination of the abdomen revealed nothing abnormal. It was decided that the tumour was a tumour of the spleen, of the cystic type. Myeloid leuchæmia, Banti's disease and the like, and tuberculosis were excluded because of the absence of accompanying signs and symptoms. Dr. Le Souef removed the enormous cystic spleen shown. The condition was probably congenital in origin. Section of the wall had not yet been done. An accessory spleen was noted at operation.

VICTORIAN BRANCH NEWS.

THE following items of news of particular interest to members of the Victorian Branch of the British Medical Association are published at the request of the Council of the Branch.

Surrender of the Conduct of Confinements to Trainee Nurses.

It was recently brought to the notice of the Branch Council that it is the practice in certain intermediate or community hospitals which are registered as training schools for trainee nurses to conduct the confinement of patients as part of the qualification necessary for registration under the *Midwives' Act*.

In most cases the patients are the private patients of medical practitioners who have been engaged to attend them, and it has been stated that at times the doctor engaged has arrived at the hospital to find a nurse gloved and gowned and prepared to deliver the patient, and he has been more or less obliged to stand by and watch the nurse conduct the case.

As it was felt that certain questions of law were involved in the practice outlined, legal opinion was sought and has been provided by courtesy of the Medical Defence Association of Victoria. The questions submitted and the answers supplied are as follows.

Question 1: Has a doctor, engaged to attend a confinement, any right to surrender the conduct of the case to a patient without the knowledge and consent of the patient?

Answer: In our opinion a doctor engaged to attend a confinement has no right to surrender the conduct of the case to a nurse without the knowledge and consent of the patient, and such consent should, if possible, be in writing or otherwise be capable of proof.

Question 2: If the case were surrendered without the knowledge and consent of the patient, would any claim lie against the doctor if she or the child suffered injury (that is, "injury" in the widest sense, including puerperal infection *et cetera*)?

Answer: In our opinion yes. In the circumstances indicated the doctor would be liable if there were any injury to the patient or child and if such injury could be attributed to the fact of the case having been surrendered or to negligence.

Question 3: If with the knowledge and consent of the patient the doctor surrendered the case, would he be absolved from any liability for the negligence of the nurse in, for example, injuring the patient or the child?

Answer: In our opinion yes. The doctor would be absolved from liability so long as he could prove the knowledge and consent of the patient, but we think the doctor should in such a case be able to show that the patient was aware that the nurse was a trainee (if such was the case); in other words, the doctor should advise the patient of the possible risk (if any) involved in surrendering the case.

Question 4: If the case were surrendered either (a) without the knowledge and consent of the patient or (b) with her knowledge and consent, would the doctor have any entitlement to claim a fee for the confinement?

Answer: If the case were surrendered either with or without the knowledge and consent of the patient, we do not think the doctor would have any claim for a fee for the confinement.

We also think it advisable where the patient is a married woman, to obtain the husband's consent as well as the wife's consent in the cases above mentioned and more especially if the husband has engaged the doctor to attend the case.

It is clear, therefore, that any medical practitioner surrendering a case without the clearly expressed consent of the patient runs a very real risk.

Right to Refuse Admission to a Lodge List.

In August of this year a doctor in a provincial city sued a lodge member for recovery of fees for professional services rendered to the member's wife.

The facts alleged were that the doctor had attended the woman for some time as a private patient, her husband being on the list of another doctor. During the course of treatment the husband asked to be accepted on the

plaintiff's list, to which the plaintiff was agreeable, but he refused to accept the wife as a lodge patient and continued to treat her as a private patient.

When fees were claimed the husband raised the defence that his wife was entitled to treatment as a lodge member, and the police magistrate who heard the case said that by accepting the defendant on his list the doctor was bound to accept the wife; that, under the *Friendly Societies Act*, a doctor was obliged to attend the dependants of anyone accepted as a member; that he could not recognize the Common Form of Agreement which entitles a doctor to refuse to accept anyone included under the term "dependant" with whose state of health he is not satisfied; and that consequently the plaintiff could not sustain his claim.

The matter was referred to the legal advisers of the Branch, who state:

We have considered the question submitted by you as to the validity of the decision of a police magistrate that a medical officer of a lodge could not decline to take on his list any member or the wife or child of any member.

In our opinion that decision is incorrect. The magistrate appears to have based his decision on Section 5 (ii) of the *Friendly Societies Act*, 1928. This provides that societies may be registered under the Act to provide by voluntary subscriptions or levies upon the members for (among other purposes) "providing medical attendance for and dispensing medicines to the members, their husbands, wives, widows, children or kindred".

This section, in our opinion, merely prescribes the purposes for which friendly societies may be formed in order to be entitled to registration under the Act and in no way affects the position of medical officers entering into agreements with registered societies.

A society having been formed for any one or more of the prescribed purposes may obtain registration and may then seek in the best manner to carry out the purposes for which it was formed, and in order to do so may enter into any agreement it considers suitable with its medical officer.

Having entered into the agreement, the society and its members and the medical officer are bound by it.

There is no provision in the Act that, in our opinion, invalidates the provisions of Clause 3 in the medical officers' agreement as to refusal to accept on his list any person included by Clause 1 in the definition of the word "member" or the "income limit" provisions of Clause 1 and 2 appearing at the end of the agreement.

We are of opinion, however, that any refusal to accept a person under Clause 3 should be communicated by the medical officer in writing both to the secretary of the lodge and to the member concerned.

Liability after Death.

In 1934 the *Law Reform (Miscellaneous Provisions) Act* was passed in Great Britain entitling an injured party to sue the estate of a deceased person for negligence. The reason for the passage of the Act arose from the fact that, particularly in motor car accidents, a negligent person might be killed and the victims of his negligence had no redress at law. At the time it was suggested that the Act might render it possible for a patient to sue the estate of a deceased doctor for his negligence, although legal opinion was expressed that such a contingency was unlikely.

However, in 1937, the case of *Connolly versus Rubra*, where Mrs. Connolly sued the estate of Dr. Rubra for his failure to diagnose tuberculosis of the lungs by which the death of her husband was accelerated and obtained a verdict of £5,000 damages, proved that the Act did apply to cases of professional negligence.

As there was some uncertainty as to whether the provisions of the Act applied outside Great Britain, the Medical Defence Association was asked for an opinion, and

the legal advisers of the Association state that the Act has not so far been copied in Victoria, and therefore an action for personal negligence cannot be maintained against the estate of a deceased person in this State.

NEW SOUTH WALES BRANCH GOLF COMPETITION.

THE annual competition (eighteen-hole stroke handicap) for the British Medical Association Golf Cup, New South Wales Branch (donated by Dr. H. C. Rutherford Darling), was held on Monday, November 15, on the links of the Concord Golf Club, and on Thursday, November 18, on the links of the Bonnie Doon Club.

The players with the best score on each links, Dr. Bruce Hittmann at Bonnie Doon, with a score of 86-22 net 64, and Dr. Hilton Smith at Concord, with a score of 83-16 net 67; met in the final on Wednesday, November 24, on the links of the Australian Golf Club, the winner being Dr. Hittmann, with a score of 88-22 net 66.

NOMINATIONS AND ELECTIONS.

THE undermentioned have applied for election as members of the Western Australian Branch of the British Medical Association:

Barnard, Henry John Arnold, M.B., B.S., 1925 (Univ. Melbourne), Perth.

Beaumont, Alan, M.B., B.S., 1935 (Univ. Melbourne), Children's Hospital, Perth.

THE undermentioned has been elected a member of the New South Wales Branch of the British Medical Association:

Wilkinson, Jeffrey Wilmott, M.B., B.S., 1914 (Univ. Melbourne), Lock 15, Euston.

Obituary.

JULIAN GILBERT DESAILLY.

THE late Dr. Julian Gilbert Desailly, who died recently at Middle Brighton, Victoria, was born in June, 1871. He was educated at Brighton Grammar School and became an undergraduate in medicine at the University of Melbourne in 1887. He graduated as Bachelor of Medicine and Bachelor of Surgery in 1892 and 1893 respectively; subsequently he held resident appointments at the Children's Hospital, Melbourne, the Women's Hospital and the Melbourne Hospital. The greater part of his professional life was spent, however, at Camperdown, Victoria, where he practised for upwards of forty years. He moved to Middle Brighton only three and a half years before his death. At Camperdown he became known as a sound and reliable practitioner; he was trusted and loved by his patients and respected by his brother practitioners. During the Great War he saw service in Egypt with the Australian Imperial Force.

Dr. James L. Morton writes:

Having been associated with J. G. Desailly over a number of years as fellow student and fellow medical officer during war years, and later neighbouring practitioners, I regret his loss, not only because of great help given me with his assistance and advice, but also the loss of his genial companionship in our moments of leisure. His long and remarkably successful surgical career had

endowed him with a fund of experience and wisdom which he was ever ready to place at the disposal of his colleagues. His patients, even those of his newer practice at Brighton, had all become sincerely attached to him, and there is general distress amongst his old and trusted friends and patients in the western district. He may truly be designated "The Beloved Physician".

Dr. A. A. Weir writes:

I had known the late Gilbert Desailly for thirty years and his death robbed me of a friend for whom I had the very highest regard. Socially, professionally, and as members of the South-Western Division of the Victorian Branch of the British Medical Association, we had been closely associated. He was a most genial companion, a very present help in the trials and difficulties of general practice, and a regular attendant at the medical meetings. His philosophic outlook on life, his lack of humbug, his courage when in difficulty, and his sincerity enabled him to lead a life that never seemed ruffled. As a surgeon, his methods were careful, direct and skilful, and he did much good work in Camperdown, where he left many grateful patients. Broad-minded in his ideas, generous and sympathetic, he was a man to whom one could open one's heart without fear, and his passing away in the full vigour of his mental faculties was a severe loss.

Dr. E. C. Varley writes:

I was first associated with Dr. J. G. Desailly nine years ago, when I started general practice in Camperdown. Fresh from hospital in Melbourne and new to general practice, I remember with much gratitude the vast amount of help and good advice I received from him.

He had then been practising in Camperdown for about thirty years and could look back to the time when there had been no hospital and all his country work had been done with horses. He had developed an extraordinarily acute clinical sense, and I always felt I could act with confidence upon his opinion of a difficult case. He did a considerable amount of surgical work and his surgical reputation in the district was of the highest. This reputation was well deserved. As well as possessing great judgement he was very deft with his hands and seemed to achieve his results with very little effort, quickly and with almost unbelievably few instruments.

One feels that with his death the profession has lost a practitioner of outstanding ability and a man of the highest integrity. I look back on more than six years of close association with him with the utmost pleasure, and will always remember his great kindness and unfailing help to me, as well as the vast amount of unassuming good work he did for the district.

"A Doctor" writes:

As one who practised in his district and had been associated with him for about twelve years, I have been asked to say a few words about the late Dr. J. G. Desailly. I do this gladly, but with the deepest personal regret, as our relations had been of the friendliest kind.

He had been an active member of the local British Medical Association, being President of the South-Western Subdivision when he left Camperdown, after some thirty-five years there. In his work he did a good deal of surgery of a high standard, and never spared himself in his care of his patients, by whom, especially among the poor, he is greatly missed.

As a citizen he did much for his town and district in many capacities. He was especially interested in the Turf Club and field shooting, and at his club his caustic wit and dry humour were always in evidence. He lived up to the highest traditions of his profession, and is mourned by laymen and doctors alike, as one whose place it will indeed be hard to fill.

FREDERICK WILLIAM GREEN.

We regret to announce the death of Dr. Frederick William Green, which occurred on November 8, 1937, at Malvern, Victoria.

Correspondence.

RELIEF OF SUFFERERS IN CHINA.

SIR: The League of Nations Union has opened a fund for the relief of civilian sufferers in China. The Consul-General, Dr. Pao, informs the committee that the greatest need is for food, medical supplies and warm clothing. Funds raised will be spent here on food and medical supplies, and the shipping companies have undertaken to carry such goods to Hong-Kong free of freight.

Responsibility for distributing the relief in Shanghai and other devastated areas rests with the National Women's Relief Association, of which Mrs. T. V. Soong is Chairman. While the general public is being asked to supply funds for the purchase of medical instruments and supplies, it occurs to the committee that there may be some members of the medical profession who could assist this humanitarian appeal by donating instruments for which they no longer have any use, but which would be of the greatest value to hospital units in China. A list of the instruments most needed, as supplied by members of the profession in China, is appended.

Gifts of instruments should be addressed to the China Relief Appeal, League of Nations Union, Eighth Floor, Kurrajong House, 177, Collins Street, Melbourne.

Yours, etc.,

LEONARD J. C. MITCHELL.

On behalf of China Relief Committee.

2, Collins Street,
Melbourne, C.1,
November 12, 1937.

Scalpels (6½-inch), scissors (5-inch straight), scissors (5-inch curved), amputation knife, tissue forceps, Kelly's clamps (curved, 5½-inch), Halsted's haemostatic clamps (straight, 5½-inch), Kocher clamps (8-inch), Allis clamps (6-inch), bullet forceps, needle-holder (6½-inch), probes, groove directors, abdominal retractors, vein retractors, towel clips, intestinal clamps, aneurysm needles, periosteal elevators (straight), periosteal elevators (curved), chisels (large, 15 millimetres wide), chisels (small, ten millimetres wide), mallets (wooden), bone files, bone saws (butcher), rongeurs (large, highly curved), rongeurs (medium), rongeurs (small), curettes (large).

DIATHERMY TREATMENT IN INDUSTRIAL INJURIES.

SIR: In your issue of November 13 Dr. J. Kennedy raises the question of the value of electrothermic treatment in traumatic lesions, and invites comment.

At the outset, let it be admitted that this type of case represents only a small percentage of the number treated privately or in a public clinic, and only a fraction of the ills for which modern electrothermic methods are available and undoubtedly beneficial, and also that in my opinion diathermy alone is insufficient treatment for the majority of injuries.

Dr. Kennedy evidently estimates the worth of this treatment from his own observation and experience in one or more hospital physiotherapy clinics, where, as he says, "time was a factor" and "it was difficult to fit the two treatments [that is, diathermy, massage *et cetera*] into the given time".

As stated above, I do not consider that diathermy alone is sufficient treatment for the majority of traumatic lesions, but I cannot agree that the value of electrothermy should be deprecated because hospital clinics do not permit this method to be allotted its requisite time and place as an adjunct in the treatment of traumatic lesions.

As Dr. Kennedy says, theoretically the introduction of heat into the tissues as a local stimulant to the circulation

could not fail to facilitate the recovery of the injured part, and in practice this is undoubtedly so.

With the more modern methods of electrothermy the argument that it is difficult to apply if the injured part is supported by any mechanical means does not apply, as with properly equipped short and ultra-short wave machines treatment may be given without removal of support, and even through plaster, providing always that there is no closely applied metal.

After several years' experience, both in hospital and private, in long wave diathermy, and two years with more modern methods, I consider that the latest electrothermic treatment with short and ultra-short wave and infra-red radiothermy, as it should be designated, represents a considerable advance in the treatment of all conditions, including industrial injuries, where heat stimulation to the tissues is indicated. Provided always that this form of treatment is relegated to its correct position in therapy, namely, as an adjunct, and an extremely valuable one, and not regarded as a panacea for all ills *per se*.

To return to the question of the value of the ultra-long wave diathermy in the treatment of industrial injuries, I had some experience in Sydney of injured workers, where the cases were always treated privately by me, and "time was not a factor", and in every case I feel sure that considerable benefit and a shortening of the time of disability resulted from its use, in conjunction with the accepted methods of support, manipulation, massage *et cetera*. During the last two years I have treated many cases of traumatic lesions with the more flexible radiothermy methods, invariably as an adjunct and not a specific, and have very rarely failed to prove that what is apparently true in theory is undoubtedly true in practice.

Yours, etc.,

NOEL TRACEY BULL.

12, Collins Street,
Melbourne, C.1,
November 17, 1937.

SIR: An article by Dr. J. Kennedy, F.R.C.S., in THE MEDICAL JOURNAL OF AUSTRALIA of November 13, 1937, needs a reply because of its total misunderstanding of the part diathermy should take in the treatment of industrial injuries. If there was a general tendency in many clinics to neglect rest, support, massage, manipulation *et cetera*, and rely almost exclusively on diathermy, no wonder results were poor. Diathermy was never meant to be a sole form of treatment for injury; it was simply an added help in cases where a knowledge of physiology suggested that an increased blood supply would aid healing. What would be thought of a general who jettisoned infantry, artillery, aeroplanes and engineers and relied solely on tanks?

To imply that in an efficient clinic there is not time to employ two or, if necessary, three complementary methods of physiotherapy is absurd; I have just returned from looking through the physiotherapy departments of a number of American hospitals, where, in a great majority of cases, each patient receives two or three or, if necessary, four kinds of treatment. This point is well expressed by Cawardias in an article on infra-red in the *British Journal of Physical Medicine* of September, 1937.

Infra-red irradiation, as well as all other physical methods, can never act alone; . . . the only principle we can accept is that infra-red irradiation, for example, has a definite place in the therapeutic combination to be applied.

This is equally true of diathermy.

Another cause of failure would appear to be the absurdity of giving twenty-minute treatments—less than half the minimum useful time.

Then there comes a most extraordinary categorical statement. Referring to massage, manipulation, and active movements, Dr. Kennedy states: "These methods must give rise to a greater circulatory stimulus than that given by electrical methods" (that is, short or long wave diathermy).

That is a flat contradiction, without any evidence given to support it, of all modern teaching, backed up by experiment, physics and physiology, that, diathermy, especially in the form of electro-magnetic induction, is the most efficient producer of active hyperemia.

The use of the inductotherm now makes it possible to apply heat without disturbing "strapping, splints, bandages or plaster", provided only that no metal is present; but Dr. Kennedy does not mention this, though he does mention short wave diathermy. As the nomenclature is still doubtful there was all the more reason for him to define his terms carefully.

"It is yet to be proved that diathermy has reduced the disability in any case." To the "I will not believe" type of mind proof may be impossible, but for the reasonable mind some from among the thousands of cases reported by reputable doctors have been proof enough. For easy reference I suggest that Dr. Kennedy look up some cases reported by me in the Journal of September 11, 1937. Several of these he will see were referred by other doctors and some were insurance cases, so there was a check on my observations.

Finally, as a suggestion that the more modern methods of physiotherapy are proving their worth beside the older methods, let me quote the equipment of the Illinois Central Hospital, Chicago. This is a hospital of 255 beds, maintained almost exclusively for the treatment of the employees of the Illinois Central Railway system. There are in use one diathermy, one inductotherm, twelve infra-red lamps, one infra-red cabinet, two ultra-violets, one sinusoidal machine, one Bristow coil, one fever bag. A great industrial concern with a direct financial interest in getting its injured workmen fit as quickly as possible thinks it worth while to supplement (not replace) the older methods by this most modern electrical equipment.

Yours, etc.,

E. P. DARK.

Katoomba,
New South Wales.
Undated.

SIR: I have read Mr. Kennedy's article with considerable surprise.

It is regrettable that he should publicly condemn so valuable a form of therapy, when it is apparent that his conclusions are based on a misuse of the treatment.

Most physiotherapists will agree that to use diathermy to supplant the older methods of massage, manipulation and exercise is to imply a grave misconception of its therapeutic application. Diathermy should be used as an adjunct, and not as a substitute for these methods. If used in this manner, I think Mr. Kennedy will be convinced of its value, not only of itself, but as a valuable preliminary to movement of a part.

The value of diathermy, and of short wave, lies in the fact that a deeper penetration of heat is effected than in other forms of heat therapy.

Mr. Kennedy remarks that the use of the diathermy machine is very easily acquired. May I reply that it is not a difficult matter to acquire the technique of many a surgical procedure; but the knowledge of when to operate is another matter.

Yours, etc.,

LEIGH T. WEDLICK.

41, Spring Street,
Melbourne,
November 23, 1937.

DENTISTRY IN THE COUNTRY.

SIR: I read your leading article of August 21, on dentistry in the country, in which you state that, except for school dental clinics, you do not know if people can receive any dental attention except by paying private fees.

All practitioners will agree with your statement that the provision of dental treatment for the poor and needy

is a matter of national health. However, no steps could be taken to remedy the lack of dental care of the poor unless it is known whether and to what extent that care is lacking. As the responsibility for the health of the nation lies with the medical profession, I think it is our duty to find out if the poorer sections of country people are being deprived of their right to have adequate dental attention. I would suggest that an effort be made to ascertain the exact state of affairs by a questionnaire in your columns.

Yours, etc.,

"COUNTRY PRACTITIONER."

November 20, 1937.

TUBERCULOSIS.

SIR: It is interesting to see the question of tuberculin being brought up in your correspondence column.

The modern trend seems to be to flatly condemn the use of tuberculin. Opinions like those of Dr. A. A. Palmer, gained in the *post mortem* room, cannot be disregarded.

We must therefore look for something that will put heart into those practitioners who do feel inclined to give their patients the benefit of tuberculin.

With that in view, may I quote the following.

Dr. Pottinger: "Experience has now so accumulated that tuberculin does do good, that the practitioner should look to the best methods of making use of it, and not as to whether tuberculin is of use or not. In other words, he should blame his methods of use, and not the tuberculin, in case of failure."

Professor Sahli: "Tuberculin treatment should be undertaken with the same care and supervision as the prescribing of digitalis."

Yours, etc.,

ALFRED E. FINCKH.

227, Macquarie Street,
Sydney,
November 22, 1937.

GROUP HOSPITALIZATION.

SIR: The report just published by the American Medical Association on group hospitalization is lengthy and full of interest. The system is voluntary and identical in principle with the hospital insurance system employed by the Koorumburra Bush Nursing Hospital. The number of contributors was 300,000 in January, 1936, and has risen to 700,000 in January, 1937. There are several plans in operation, and the rate of increase has varied greatly. It is obvious that with this experience the most suitable detailed method will ultimately emerge.

Yours, etc.,

JAMES W. BARRETT.

103-105, Collins Street,
Melbourne,
November 23, 1937.

UNUNITED FRACTURES.

SIR: Dr. C. Craig, of Launceston, has discussed certain aspects of the treatment of ununited fractures, and is to be congratulated on making suggestions which may prove to be of value in these cases.

There are certain points, however, which must be kept in mind in the treatment of an ununited fracture.

Dr. Craig apparently is under the impression that an autogenous bone graft often fails to produce union. This pessimistic outlook is not supported by experiences of the last few years, and personally I have found that it is an operation of exceptional merit, and almost always successful in producing bony union.

The suggestion that the operation be divided into two stages is open to certain objections. In the first place it must be remembered that bony union depends, not on the number of bone-forming cells in the vicinity, but upon the richness of the neighbouring blood supply.

In the operation suggested by Dr. Craig this surrounding hyperæmia cannot be transferred with the graft. Bony union depends entirely on obtaining a vascular connexion between the two opposing bone surfaces. Interference with the fracture site after fourteen days is strongly contraindicated, because it is about this time that the masses of granulation from the opposing fragments fuse and reestablish the vascular connexion. Any interference at this stage disturbs the endothelial vascular outgrowths and they are strangled by fibrous tissue.

Therefore it appears to be essential for the graft to be placed in position immediately the bed has been prepared in the host bone, so that the post-operative clot forms a basis on which callus forms, and thus there is no disturbance of the sanctity of the normal healing process.

Failure after bone grafting is most often due to a fracture of the bone graft, and this would be more likely to occur when the graft has been partially separated previous to the transplant, because the changes in the bone at first consist of an increased hyperæmia with the accompanying decalcification.

In fractures of the neck of the femur delay in union is caused not by lack of blood clot and bone cells, but by a poor blood supply to the capital fragment, which would apparently not be improved by the suggested procedure.

Yours, etc.,

F. H. McCLEMENTS CALLOW.

135, Macquarie Street,
Sydney,
November 29, 1937.

THE ART OF VISITING THE SICK.

Sir: Dr. J. G. Sleeman, in his paper on the treatment of pneumonia in the journal of November 27, refers to the art of visiting the sick, and I think most of us will agree with him that it is an art in dire need of cultivation.

A very intelligent friend of mine thought of a splendid way of protecting herself from the well-meant attentions of her visitors. She took with her to hospital half a dozen books that she loved, from which she asked the talkative ones to read. Everybody was happy; the patient could listen or not as she wished, and the visitor was happy to be talking.

I have stored this tip up in case I needed it myself, but it struck me that it might be useful to others too.

Yours, etc.,

T. MAYNARD FURBER.

143, Macquarie Street,
Sydney,
November 29, 1937.

Congresses.

THE NINTH AUSTRALIAN CANCER CONFERENCE.

THE ninth Australian Cancer Conference will be held in Sydney from April 5 to 8, 1938, and will form part of the official sesqui-centenary celebrations.

For this conference it has been decided that the principal subject for clinical discussion will be cancer of the uterus—corpus and cervix. In this connexion, in addition to papers by individuals authors, a compilation will be made of data covering the results obtained in the treatment of cancer of the uterus by various methods, surgical, radiological or combined.

For the past ten years careful records have been kept at a large number of treatment institutions, and patients have been followed up after treatment so that the results of treatment are actually known. In addition to the statistical data which will be supplied by the various treatment institutions and which will cover a large number of patients treated in institutions, it is desired to provide an opportunity for those individual surgeons, gynecologists and radiologists who may desire to do so, to present their figures for inclusion in the compilation.

It would not be practicable to make separate presentations to the conference of the individual compilation of each surgeon, gynecologist or radiologist, but it is proposed to include in the consolidated compilation the figures supplied by such individuals. In order that the figures may be susceptible of consolidation, it is obvious that it will be necessary for them to be compiled in a uniform way by each person who may cooperate, and that certain definite procedures should be followed in compiling the data.

A form has been drawn up to enable uniform compilation to be made, and directions have been prepared explaining in full detail the presentation of the data. A cordial invitation to cooperate is extended by the Commonwealth Department of Health to any surgeon, gynecologist or radiologist who may find it possible to supply data on the form adopted, and in accordance with the directions. Returns on the appropriate form should be forwarded to reach the Director-General of Health, Commonwealth Department of Health, Canberra, not later than January 5, 1938.

A copy of the directions and a supply of the adopted form will, on application, be forwarded to any surgeon, gynecologist or radiologist who may desire to cooperate. It should be noted that if figures are not supplied in accordance with the directions, or if they are not received by January 5, 1938, it would not be possible to include them in the figures to be presented to the Australian Cancer Conference.

Proceedings of the Australian Medical Boards.

NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act, 1912 and 1915*, of New South Wales, as duly qualified medical practitioners:

Crabbe, Gavin Murray, M.B., B.S., 1927 (Univ. Adelaide), Broken Hill and District Hospital, Broken Hill.
Barton, Alan Sinclair Darvall, F.R.A.C.S., 1928, Singleton.
McIlraith, Muriel Betty, F.R.C.S. (England), 1935, Turramurra.
Millard, Philip Thornton, B.S., 1937 (Univ. Sydney), Lindfield.
Stening, Samuel Edward Lees, D.C.H., R.C.P. (London) and R.C.S. (England), 1937, 248, Bondi Road, Bondi.

Books Received.

MATERIA MEDICA FOR NURSES, by A. M. Crawford, M.D., F.R.F.P.S.G.; Fourth Edition: 1937. London: H. K. Lewis and Company Limited. Crown 8vo, pp. 114. Price: 3s. 6d. net.

THE SCIENCE AND PRACTICE OF SURGERY, by W. H. C. Romanis, M.A., M.B., M.Ch., F.R.C.S., F.R.S., and P. H. Mitchiner, M.D., M.S., F.R.C.S.; Volume I: General Surgery; Volume II: Regional Surgery; Sixth Edition: 1937. London: J. and A. Churchill Limited. Medium 8vo, pp. 893 (Volume I) and 1063 (Volume II), with 800 illustrations. Price: 14s. net each volume.

Medical Appointments.

Dr. L. A. Gardiner has been appointed Government Medical Officer at Barmedman, New South Wales.

Dr. E. J. G. Howe has been appointed Government Medical Officer at Rylstone, New South Wales.

Dr. M. F. Deck has been appointed Government Medical Officer at Bowraville, New South Wales.

Dr. R. D. Mulvey has been appointed Government Medical Officer at Bathurst, New South Wales.

Dr. A. B. McCutcheon has been appointed Medical Officer of the Inebriates' Institution, Royal Park, Victoria, pursuant to the provisions of the *Inebriates Act, 1928*, of Victoria.

Dr. B. F. R. Stafford has been appointed Acting Medical Superintendent, Hospital for the Insane, Goodna, Queensland, under the provisions of *The Public Service Acts, 1922 to 1924*, and *The Insanity Acts, 1884 to 1935*, of Queensland.

Dr. W. P. H. Parker has been appointed Acting Superintendent, Hospital for the Insane, Ipswich, Queensland, under the provisions of *The Public Service Acts, 1922 to 1924*, and *The Insanity Acts, 1884 to 1935*, of Queensland.

Dr. W. H. Matheson has been appointed, pursuant to the provisions of the *Workers' Compensation Acts*, a Certifying Medical Practitioner and Medical Referee at St. Arnaud, Victoria.

Dr. J. Coffey has been appointed Deputy Director-General of Health and Medical Services of Queensland, according to the provisions of *The Public Service Acts, 1922 to 1924*, of Queensland.

Diary for the Month.

- DEC. 7.—Tasmanian Branch, B.M.A.: Council.
 DEC. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 DEC. 7.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 DEC. 9.—New South Wales Branch, B.M.A.: Branch.
 DEC. 10.—Queensland Branch, B.M.A.: Annual Meeting.
 DEC. 14.—Tasmanian Branch, B.M.A.: Branch.
 DEC. 14.—New South Wales Branch, B.M.A.: Ethics Committee.
 DEC. 15.—Western Australian Branch, B.M.A.: Branch.
 DEC. 17.—Queensland Branch, B.M.A.: Council.
 DEC. 21.—Tasmanian Branch, B.M.A.: Council.
 DEC. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 DEC. 30.—South Australian Branch, B.M.A.: Branch.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," pages xx to xxiii.

FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Resident Medical Officer.

MACKAY HOSPITALS BOARD, MACKAY, QUEENSLAND: Resident Medical Superintendent.

BRISBANE AND SOUTH COAST HOSPITALS BOARD, QUEENSLAND: Honorary Officers, Professor of Obstetrics.

AYR HOSPITALS BOARD, AYR, QUEENSLAND: Junior Medical Officer.

THE RACHEL FORSTER HOSPITAL FOR WOMEN AND CHILDREN, SYDNEY, NEW SOUTH WALES: Honorary Officers.

HOSPITALS COMMISSION, SYDNEY, NEW SOUTH WALES: Honorary Radiologist.

MOUNT MAGNET HOSPITAL, MOUNT MAGNET, WESTERN AUSTRALIA: Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135 Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 178 North Terrace, Adelaide.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

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